M5 Junction 10 Improvements Scheme

Environmental Statement (ES)

Cumulative Effects Assessment chapter

TR010063 – APP 6.13

Regulation 5 (2) (a)

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M5 Junction 10 Improvements Scheme

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6.13 Environmental Statement (ES)

Cumulative Effects Assessment chapter

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15. Cumulative Effects Assessment

15.1. Introduction

15.1.1. This chapter presents the cumulative effects assessment (CEA) part of the environmental assessment for the M5 Junction 10 Improvements Scheme ("the Scheme"), based on the Scheme as it is described in Chapter 2 – The Scheme (Aapplication document TR010063/——APP/–6.2), and detailed in the General Arrangement Plans (applicationApplication document TR010063 – APP 2.9). The chapter sets out the standards and methodologies that have been used to carry out the CEA for the Environmental Statement (ES). It expands upon the proposed approach to CEA for the Scheme, as described in Chapter 4 – Environmental Assessment Methodology (applicationApplication document TR010063/——APP/–6.2). It confirms the type of cumulative impacts that have been considered in seeking to identify potentially significant cumulative effects; and the methodology for inter-project CEA is described in more detail.

15.1.2. Chapter 4 – Environmental Assessment Methodology (applicationApplication document TR010063/——APP/–6.2) indicates where the different aspects of CEA are reported within the ES. This chapter refers to a long-list of development proposals within the planning system that will form one category of projects that are termed Reasonably Foreseeable Future Projects (RFFPs), required to underpin inter-project CEA (see Appendix 15.1 (applicationApplication document TR010063/———APP/–6.15)). The RFFP long list represents projects that are known to the planning system, meet specific criteria relative to the Scheme and may come forward within timescales that could interact with the Scheme. The way in which the RFFP long list has been reviewed and screened as the Environmental Impact Assessment (EIA) process has progressed is set out in this chapter.

15.1.3. The chapter concludes with a summary of the significant cumulative effects that have been identified through the assessment. This summary adopts a precautionary approach, meaning that where there is uncertainty about outcomes, the source of this uncertainty is described and a worst case position is assumed. This is supported by a commentary about ways in which cumulative effects associated with the worst case position may be lessened. This aspect of the reporting aligns with the Design Manual for Roads and Bridges (DMRB) LA104 guidance relating to reporting uncertainty in EIA (paragraph 2.6.1).

15.1.4. This assessment has been undertaken and reported by a team of competent cumulative effects assessment practitioners. The competent expert responsible for the assessment is an Associate Director, chartered member of the Royal Town Planning Institute (RTPI) who has an MA in Town and Country Planning and over 18 years of relevant experience in cumulative effects assessment and over 20 years of environmental planning experience. This includes undertaking strategic environmental assessment (SEA), sustainability appraisal (SA), integrated impact assessment (IIA) and EIA work for strategic plan making and major infrastructure and linear projects, including highways, for which the processes of EIA or SA/SEA have been required, including consideration of cumulative effects.

15.2. Planning policy and legislative context

15.2.1. It should be noted that this section is not intended to provide a full consideration of the relevant documents and their application to the Scheme. This information is provided within the Planning Statement and Schedule of Accordance with National Policy Statement (applicationApplication document TR010063/——APP/–7.1) that accompanies the application for a DCO.

15.2.2. Paragraph 5 of Schedule 4 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (referred to as the EIA Regulations 2017) requires an ES to include the assessment of cumulative effects. Part (e) references the requirement to consider the cumulation of effects with other existing and/or approved projects. Therefore, the environmental effects of the Scheme are also assessed in combination with the effects of other projects as part of the EIA process, where relevant information is available. The

Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 and the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 provide the relevant legislation, forming UK legislation for Nationally Significant Infrastructure Projects (NSIP) development and applications made through the Town and Country Planning Act 1990 (as amended), respectively.

15.2.3. The projects that should be considered as part of a 'cumulative' assessment for these purposes ~~is~~ are not defined in the EIA Regulations 2017 and there is no standard approach to the assessment of cumulative effects, with different projects adopting different approaches. However, potential cumulative impacts with other major developments that have the potential to give rise to significant cumulative effects need to be identified, as required by the EIA Regulations 2017. To aid in this, the Planning Inspectorate (PINS) Advice Note 17 suggests the categories of developments that should be included in such cumulative assessments. Guidance on the assessment and reporting of cumulative effects is also provided in Design Manual for Roads and Bridges (DMRB) Volume 11 Section 2, Part 4, LA 104: Environmental assessment and monitoring (LA 104). Guidance on determining the significance of environmental effects is contained within LA 104, including for cumulative effects, and for the management of those effects. IEMA publications and guidance provide a range of perspectives of CEA but conclude that there is no definitive methodology[1].

15.2.4. The National Policy Statement for National Networks (NPS NN) includes general principles of assessment. Of relevance to CEA, these assert that the Examining Authority and the Secretary of State should take into account cumulative adverse impacts as part of weighing adverse impacts against benefits. It reiterates the requirements of the EIA Regulations 2017 in relation to considering the interaction between impacts arising through different topic areas, to be reported within the ES. Paragraphs 4.16 and 4.17 relate specifically to the consideration of significant cumulative effects – they require the ES to provide information on how the effects of the Scheme would combine and interact with those of other development (pre-existing and with consent). They also reinforce the need for the decision makers to 'consider how significant cumulative effects and the interrelationship between effects might as a whole affect the environment, even though they may be acceptable when considered on an individual basis with mitigation measures in place.'

15.2.5. The National Planning Policy Framework (NPPF) 2023~~1~~ is "an important and relevant consideration in decisions on nationally significant infrastructure projects, but only to the extent relevant to the project" (NPS NN para. 1.18). The principles to be applied to cumulative effects assessments that are outlined within the NPPF have been used as an informative in the preparation of this CEA chapter (noting that the NPPF interprets the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, as opposed to the EIA Regulations 2017 that relate to NSIPs).

15.3. Methodology

15.3.1. The (DMRB) LA104 provides a definition of cumulative effects as 'impacts that result from incremental changes caused by other present or reasonably foreseeable actions together with the project.' A distinction is drawn between combined impacts of a number of different environmental factors from a single project; and combined impacts of a number of different projects within the vicinity. In both cases, these impacts are explored in relation to a single receptor or resource. PINS also provides guidance on cumulative effects assessment within PINS Advice Note 17 (version 2, August 2019). The summary of PINS Advice Note 17 acknowledges that there is no single agreed industry standard methodology and that the approach taken to CEA varies between applications. PINS Advice Note 17 is therefore presented as offering a staged process that applicants may wish to adopt in CEA for NSIPs.

15.3.2. The CEA methodology followed for the Scheme has been informed by the DMRB LA104 guidance, PINS guidance and the principles to be applied to CEA as expressed within the

[1] IEMA EIA guide to delivering quality development July 2016; IEMA Impact Assessment Outlook Journal Vol 7: July 2020 – Demystifying Cumulative Effects

NPPF; and developed on the basis of professional judgement and experience with a focus on generating tangible and practical outcomes from the assessment. For the purposes of this project, the CEA explores the way in which the predicted effects of the Scheme on receptors/resources may alter when they are considered in their totality (i.e. across all topic assessments), which reflects the DMRB LA104 definition of single project impacts; as well as in the context of RFFPs that could potentially interact with the Scheme, which reflects the DMRB LA104 definition of different project impacts. These two strands of CEA are referred to in this report as intra-Scheme assessment and inter-project assessment, respectively. These types of impacts are summarised below, based on the introduction provided in Chapter 4 – Environmental Assessment Methodology; with signposting to where the impacts are reported within the ES as a whole.

Table 15-1 – Types of cumulative impacts and location of reporting within ES

Types of cumulative impact	Location of reporting within ES
Intra-Scheme cumulative impacts (single project impacts)	
Intra-Scheme in-combination cumulative impacts[2], identified within specialist topic chapters	**If relevant, reported within specialist topic chapters** Reporting is provided under cumulative effects sub-heading in instances where a receptor/receptors has/have been assessed as experiencing a number of different environmental factors relating to that topic.
Intra-Scheme in combination cumulative impacts across topics	**Reported within this CEA chapter** Reporting is provided within this CEA chapter in instances where a receptor/receptors has/have been assessed as experiencing different environmental factors relating to two or more specialist topic assessments.
Inter-project cumulative impacts (different project impacts)	
Inter-project additive cumulative impacts[3] identified within specialist topic chapters	**If relevant, reported within specialist topic chapters** Reporting is provided under cumulative effects sub-heading in instances where a receptor/receptors has/have been assessed as experiencing a Scheme impact that combines with the same type of impact from one or more RFFPs, to generate a greater magnitude of impact.
Inter-project additive cumulative impacts across topics	**Reported within this CEA chapter** Reporting is provided within this CEA chapter in instances where a receptor/receptors has/have been identified as experiencing additive cumulative impacts within at least two specialist topic chapters.
Inter-project in-combination cumulative impacts identified within specialist topic chapters	**If relevant, reported within specialist topic chapters** Reporting is provided under cumulative effects sub-heading in instances where a receptor/receptors has/have been assessed as experiencing a Scheme impact that combines with one or more different types of impact relevant to the topic, from one or more RFFPs, to generate a third type of impact.
Inter-project in-combination cumulative impacts across topics	**Reported within this CEA chapter** Reporting is provided within this CEA chapter in instances where a receptor/receptors has/have been assessed as experiencing a Scheme impact and different type of RFFP impact that combine to generate a third type of impact.

15.3.3. The latter category of inter-project in-combination effects is not directly referenced in the IEMA guidance; however, professional experience has shown that it is valuable to capture

[2] Figure 4-2 refers (application document TR010063 – APP 6.2)
[3] Figure 4-1 refers (application document TR010063 – APP 6.2)

instances where a range of impacts from different projects can generate additional types of impacts for specific receptors.

Approach to intra-Scheme CEA

15.3.4. The assessment methodology for intra-Scheme in-combination cumulative effects requires the identification of impact interactions associated with the Scheme on key environmental receptors. This will ensure that the ES for the Scheme is not a series of separate assessments collated into one document, but rather, a comprehensive assessment drawing together the environmental effects of the Scheme in the context of the most affected receptors.

15.3.5. At the topic level, intra-Scheme cumulative impacts are relevant only where the assessment scope explores different types of impacts. Furthermore, for some topics the assessment methodology inherently incorporates intra-Scheme in combination impacts in reaching conclusions about the effects of the Scheme on a receptor. On this basis, the approach taken for intra-Scheme CEA is set out in the relevant topic chapters.

15.3.6. At the cross-topic level, the approach to identifying intra-Scheme cumulative impacts is receptor focused. Cross-referencing is undertaken to identify receptors that are noted as experiencing impacts across each of the topics, resulting in the production of a cross-tabulation noting all receptors where at least two specialist assessments report effects against the same receptor. This cross-tabulation then provides the basis for a qualitative analysis of the nature of the cumulative impacts from the Scheme on the receptor in question; followed by an evaluation of the resultant cumulative in-combination effects of the Scheme. This CEA chapter reports the findings on a two-step basis:

- Step 1: a narrative is provided for the receptors identified as experiencing cross-topic in-combination cumulative impacts. This notes the source of the impacts and indicates how this may manifest for the receptor. An assessment of effects is provided – this takes account of the sensitivity of the receptor as assigned by the relevant contributing technical assessments; and the magnitude of the impact as reported in the contributing technical assessments. A conclusion about the cumulative effects is then drawn, having regard to the guidance in DMRB LA104 – this takes account of the topic level residual effects assessments (i.e. the Scheme, plus embedded mitigation and topic-specific essential mitigation).
- Essential mitigation for cumulative effects is noted, which represents additional matters that have been agreed to target specific findings of the cumulative effects assessment.
- Step 2: a residual assessment of cumulative effects and their significance is provided. In addition to the items that inform the assessment at Step 1, this residual assessment takes account of essential mitigation for cumulative effects identified through the CEA process and how this may change the Step 1 assessment findings.

15.3.7. Moderate, large and very large residual effects are considered to be ‘significant’ in terms of the EIA Regulations 2017.

Approach to inter-project CEA

15.3.8. The assessment methodology for inter-project cumulative effects (both additive and in-combination) requires the potential interaction of the Scheme with RFFPs (introduced in Chapter 4 – Environmental Assessment Methodology (~~application~~Application document TR010063/~~—~~APP/-6.2) and described in the next sub-section) to be carefully considered. The principle of the assessment of the potential for inter-project cumulative effects to be reported in the ES is based on the four-stage assessment approach to cumulative assessment, as outlined in PINS Advice Note 17. This has been adapted to generate the following four steps:

- Stage 1: generate the RFFP long-list – the criteria for the long-list sets the study area for the inter-project CEA; and desk-based research is undertaken to identify all qualifying projects.
- Stage 2: generate the RFFP short-list – apply threshold criteria based on temporal

scope, the scale and nature of other development and any other relevant factors to assist (e.g., the level of assessment information that is available in relation to a given RFFP) in deciding whether to include or exclude RFFPs from detailed consideration in the CEA. Some RFFPs may be screened out at this stage due, for example, to small scale or a lack of sufficient publicly available information to inform a meaningful assessment.

- Stage 3: information gathering – seek to compile information on the shortlisted RFFPs, including proposed design and location, quantum and type(s) of development, programme of construction, operation and decommissioning and environmental assessment information.
- Stage 4: assessment – assess the potential cumulative effects of the Scheme with the shortlisted RFFPs. This is undertaken for the specialist topics in the first instance, considering factors such as the duration of effect, extent of effect, type of effect, frequency of the effect, value and resilience of affected receptors and the likely success of mitigation. The findings of the topic specific assessments are then reviewed in their totality to enable cumulative effects to be reported by receptor and cross-topic within the CEA chapter.

15.3.9. The ES reports on the four stages above in the following way:

- Stage 1: generate the RFFP long-list – the criteria for the long-list is provided in this CEA chapter. The long list for the Scheme is provided at Appendix 15.1 (~~application~~Application document TR010063~~-~~/~~—~~APP/~~-~~6.15).
- Stage 2: generate the RFFP short-list – specialist topic chapters provide information about how the RFFP long-list was screened for relevance to the topic inter-project cumulative effects assessment. The resultant RFFP shortlist, taking account of all topics, is included in this CEA chapter at Table 15-3.
- Stage 3: information gathering – Table 15-3 of this CEA chapter provides an overview of relevant information on the shortlisted RFFPs. This includes assumptions that have been made for the purposes of assessment, for example, relating to the potential for overlap of construction activities. Reference to the tier system set out in PINS Advice Note 17 is also included, to reinforce the level of certainty associated with each.
- Stage 4: assessment – where a topic has scoped RFFPs in for CEA, this is reported within the relevant topic chapters. This CEA chapter provides a cross-tabulation derived from the topic specialist assessments; and supporting qualitative inter-project cumulative assessment. The assessment is presented in two-steps, as described below.

15.3.10. At the topic level, where RFFPs have been screened in, inter-project cumulative impacts may be additive or in-combination. The approach taken for inter-project CEA is set out in the relevant topic chapters.

15.3.11. At the cross-topic level, the approach to identifying inter-project cumulative impacts has focussed first on the RFFPs. Cross-referencing is undertaken to identify RFFPs that are noted as either experiencing or contributing to impacts across each of the topics, resulting in the production of a cross-tabulation noting all RFFPs where at least two specialist assessments report effects of the Scheme in combination with the same RFFP. This cross-tabulation then provides the basis for a qualitative analysis of the nature of the cumulative impacts arising from the Scheme and RFFP; and exploring what receptor(s) will experience the identified impacts. This is followed by an evaluation of the resultant cumulative effects of the Scheme and the RFFP in question. This CEA chapter reports the findings on a two-step basis:

- Step 1: a narrative is provided for the RFFPs identified as contributing to or experiencing cross-topic inter-project cumulative impacts. This notes the source of the impacts and indicates how this may manifest for different receptors. An assessment of effects is provided – this takes account of the sensitivity of the receptor(s) as assigned by the relevant contributing technical assessments; and the magnitude of the impact as reported in the contributing technical assessments. A conclusion about the cumulative effects is then drawn, having regard to the guidance in DMRB LA104 – this takes account of the topic level residual effects assessments

(i.e. the Scheme, plus embedded mitigation and topic-specific essential mitigation).

- Essential mitigation for cumulative effects is noted, which represents additional matters that have been agreed to target specific findings of the cumulative effects assessment.
- Step 2: a residual assessment of cumulative effects and their significance is provided. In addition to the items that inform the assessment at Step 1, this residual assessment takes account of essential mitigation for cumulative effects identified through the CEA process and how this may change the Step 1 assessment findings.

15.3.12. Moderate, large and very large residual effects are considered to be 'significant' in terms of the EIA Regulations 2017.

RFFPs

15.3.13. RFFPs are projects that are known to the planning system or already in the consenting process or under construction at the same time as the Scheme. The locational criteria that have been applied to this Scheme have been developed in consideration of the study areas defined within the preceding topic chapters, taking account of the likely zones of influence for interactions between the Scheme and different types of RFFPs to give rise to significant cumulative effects.

15.3.14. The RFFP long-list includes projects that fall into one of the following categories – these categories have been developed for this Scheme on the basis of professional judgement, previous experience of developing mitigation strategies for cumulative effects. They also encompass projects that fall in the definition of 'other existing development and/or approved development' in PINS Advice Note 17 and the criteria in DMRB LA104 (13.21.2):

- Major planning applications within 500 m of the Order limits. This encompasses planning applications for 10 or more residential properties, planning applications incorporating commercial/recreational floorspace over 1,000 sqm, or a site exceeding 1 ha.
- Planning applications within or up to 250 m from the Order limits that have been granted planning permission or are pending determination within a time frame that reflects the typical 3-year period within which granted developments must commence works (at the point at which the RFFP long list is first produced; and updated at each subsequent review of the RFFP long list).
- Planning applications or consented development that are accompanied by an ES or non-statutory environmental report, situated within 5 km of the Order limits.
- Proposals registered with PINS as forthcoming applications for DCO, or for which an application for a DCO has already been made. Professional judgement and consultation with local authorities (TBC, CBC and GCC) are used to determine which are of relevance to the Scheme in the context of possible cumulative impacts, using proximity to the Order limits as a key consideration, starting at an outer limit of 5 km.
- Registered Transport and Works Act Order (TWAO) applications near to the Scheme. Professional judgement are used to determine which are of relevance to the Scheme in the context of possible cumulative impacts, using proximity to the Order limits as a key consideration.
- Development Plan projects such as the site allocations, safeguarded sites and transport initiatives scheduled for development within the Joint Core Strategy (JCS) (therefore proposed for implementation by 2031, which pre-dates the operational future baseline for the Scheme) that are within 5 km of the Order limits (with the flexibility to consider additional projects if consultation with TBC and CBC identifies a need). The inclusion of such projects is subject to desk-based validation of sufficient evidence available relating to the projects to allow a meaningful cumulative effects assessment for the Scheme, together with consideration of whether such projects are dependent upon the Scheme for their progression and/or have the potential to affect the traffic flows on links that are relevant to the transport, noise and vibration and air quality assessments.

15.3.15. A review of planning applications has been undertaken and the RFFP long-list for the Scheme is provided at Appendix 15.1 (~~application~~Application document TR010063/~~–~~APP/~~–~~6.15). The review has not identified any relevant projects registered with PINS or TWAO applications. The RFFP list requires periodic review to remain relevant and proportionate to the level of assessment required for the Scheme – this was last undertaken in June 2023.

15.3.16. It should be noted that National Highways is promoting a strategic transport project – the A417 Missing Link, with a DCO granted. This project is beyond the 5km threshold applied in generating the RFFP long-list. The nature of project impacts has been considered in consultation with Gloucestershire County Council (GCC). Given the distance between the Scheme and the A417 Missing Link project, changes in the pattern and distribution of traffic flow have been identified as the source of interaction with the Scheme that has the potential to give rise to cumulative impacts.

15.3.17. Consultation with GCC has highlighted that, in addition to the A417, there are other strategic and local transport projects affecting the network around Cheltenham and Gloucester in similar timeframes to the Scheme, but that these fall outside the scope of the RFFP long-listing criteria. In order to adequately account for this potential source of cumulative effects (i.e. changes in the traffic distribution at a network scale), this CEA provides a separate narrative assessment of the issues and opportunities that multiple changes to the transport network may present in the context of managing cumulative effects at a strategic transport network scale. This also reflects the DMRB LA104 requirement to report on cumulative effects of road projects that have been confirmed for delivery over a similar timeframe (3.21.2, part 1).

RFFP short-listing

15.3.18. The RFFP long-list (Appendix 15.1, ~~application~~Application document TR010063/~~–~~APP/6.15) has been reviewed to scope out those projects that are unlikely to have notable interactions with the Scheme. This is based on professional judgement, typically considering factors such as the type of development proposed, proximity to the Scheme and the level of publicly available information to support meaningful CEA.

15.3.19. Each short-listed RFFP (Table 15-3~~Table 15-3~~Table 15-3) has been reviewed to determine progression through the consenting and development processes, based on publicly available information and any relevant stakeholder comments. An assumption has been made about the most likely stage of their progression in relation to the Scheme construction period (2025 to 2027), opening year future baseline (2027) and operational future baseline (2042). Reference to the level of certainty is provided, using the tier system set out in PINS Advice Note 17.

15.3.20. Each short-listed RFFP (Table 15-3~~Table 15-3~~Table 15-3) has been assigned to one of the following categories to inform the completion of the inter-project CEA work:

- Construction baseline – 'undeveloped site', which is used for a site at which construction is not expected to commence until the Scheme is operational.
- Construction baseline – 'under construction' in same timeframe as the Scheme, reflecting at least a partial overlap in construction timeframes.
- Construction baseline – 'receptor', which is used for a site where construction of at least some of the RFFP is expected to be complete prior to the start of construction of the Scheme and occupants/users of the RFFP may therefore have the potential to experience construction impacts from the Scheme.
- Future opening year baseline – 'under construction' as the Scheme commences operation.
- Future opening year baseline – 'receptor', which is used for a site where development will be complete and in occupation, therefore forming a receptor and/or biophysical feature for the operational Scheme and, possibly, having potential to experience operational impacts from the Scheme.

15.3.21. Given the projected timescale for the future operational year baseline for the Scheme, there is a blanket assumption that short-listed RFFPs will be operational by that time,

unless there is sufficient phasing information to merit a different assumption to be made. As a general rule, each RFFP must be considered in the CEA as having the potential to experience operational impacts from the Scheme, as a receptor (if not at Opening Year, then by 2042, which is the projected future baseline). It is also important to note that due to the level of uncertainty associated with RFFPs, the specialist topic assessments do not typically make the same blanket assumption in projecting the future baseline for specialist assessments – the influence of the RFFPs is generally only factored in within the CEA reported in each chapter (rather than the main assessment of Scheme impacts and effects). On this basis, consideration of the impacts of the Scheme on new receptors present due to RFFPs is identified separately where appropriate. This is variously as a narrative around potential future baseline changes; or within the CEA sub-sections of each specialist chapter. Where specialist topic chapters have diverged from this approach, for example Human Health, this is set out within the relevant topic.

15.3.22. Each of the topic specialists has screened the RFFP shortlist, to identify those projects that have reasonable potential to interact with the Scheme in respect of their topic and, therefore, potentially give rise to impacts that could result in cumulative effects. The methodology and considerations applied by each topic specialist to complete the screening are set out in the CEA sections of each topic chapter.

15.3.23. Where appropriate, specialists have also completed a scoping exercise to exclude detailed consideration of RFFPs where there is a robust justification for assuming that cumulative impacts will not occur between the Scheme and the RFFP – this is also set out in individual topic chapters of the ES where it is relevant. An example is where it can be assumed that legal requirements on all developers to adhere to certain environmental legislation will ensure the avoidance of adverse impacts and therefore no scope for cumulative effects to arise. This approach is necessary to tighten the scope of consideration of RFFPs and specialist topic assessment to cumulative impacts with the potential to give rise to significant cumulative effects; and that therefore bring meaningful inputs to the overall ES findings. This approach is intended to deliver a proportional assessment that focuses on the potential for significant inter-project cumulative effects.

Limits of deviation

15.3.24. The assessment has been conducted within the Limits of Deviation (LoD) outlined within Chapter 2 - The Scheme (~~application~~Application document TR010063/~~—~~APP/-6.2). The vertical and lateral LoD for the Scheme have been reviewed with respect to sensitive receptors identified within this ES chapter, and would not affect the conclusions of the assessment reported in this chapter.

15.4. Consultation

15.4.1. The Scoping Opinion included comments on the CEA methodology. The response to the Scoping Opinion (Appendix 1.2, ~~application~~Application document TR010063/—APP/-6.15) indicates how they have been taken into consideration.

15.4.2. Consultation has been used to verify the RFFP shortlisting process and outcomes. Relevant officers at Tewkesbury Borough Council (TBC), Cheltenham Borough Council (CBC) and GCC were contacted in October and November 2022 to confirm agreement with the screening process used to develop the long and shortlists.

15.4.3. GCC has been consulted regarding the CEA findings as the assessment has been developed. Specialist officers have provided perspectives on what is practicable in terms of influencing third party project promoters to manage potential inter-project cumulative effects, as well as managing cumulative impacts of GCC and NH projects on the strategic transport network in the county. This consultation has informed the proposals for essential mitigation; and the conclusions drawn about how such essential mitigation may alter the residual assessment conclusions, should it be successful.

15.5. Future baseline conditions

15.5.1. The future baseline environment for the purposes of the CEA comprises the existing baseline, together with new or changed characteristics and conditions that can reasonably be predicted to be present during construction and/or operation of the Scheme. These characteristics are derived from the collation of the list of RFFPs; and the published information available for each regarding construction timescales.

15.5.2. The CEA makes use of two future baselines for the Scheme to be considered against, making informed assumptions to categorise the likely progression of RFFPs for the purposes of consistent assessment. These are set out below:

- Opening year future baseline (2027): RFFPs may be categorised as 'undeveloped'; 'under construction' in the same timeframe as the opening of the Scheme; or form new 'receptors/resources' that would be in place and operational in the same timeframe as the opening of the Scheme.
- Operational future baseline (2042): RFFPs may be anticipated to be 'under construction' in the same timeframe as the future baseline; or form new 'receptors/resources' that would be in place and operational.

15.5.3. There are two main contributing elements in the definition of the future baselines that are considered within the ES.

- RFFPs sourced in the manner described above.
- Forecast changes in traffic conditions projected within local authority traffic forecast models. These have been provided by GCC through incorporation within the traffic and transport modelling of future growth scenarios (principally the growth levels proposed in the JCS) once the Scheme is operational. Further details about this are referenced in Chapter 5 – Air Quality (~~application~~Application document TR010063/~~–~~APP/~~-~~6.3) and Chapter 6 ~~–~~– Noise and Vibration (~~application~~Application document TR010063/~~––~~APP/~~-~~6.4) of the ES, which draw on traffic modelling outputs. It should be noted that these topic assessments avoid duplicating or artificially magnifying impacts associated with traffic and transport, where specific RFFPs are known to already be accounted for within the traffic modelling upon which these assessments rely.

15.6. Impacts

15.6.1. The CEA builds upon the findings of the specialist topic assessments. The value and significance of impact is therefore determined by the criteria set within the individual topic chapters. The description of significance of any resulting cumulative effects takes account of the guidance in PINS Advice Note 17 to consider the capacity of environmental resources and receptors to accommodate any changes that are likely to occur.

15.6.2. The assessment of cumulative effects arising from impacts considers the following factors:

- The duration of the effect (temporary or permanent).
- The extent of the effect (geographical area of an effect).
- The type of the effect (additive or synergistic).
- The source of the effect experienced by the receptor (intra-Scheme, inter-project, or potentially both).
- The frequency of the effect.
- The value and resilience of receptors.
- The likely success of proposed mitigation.

15.6.3. Where there is sufficient information and certainty, effects are identified as short term or long term and temporary or permanent.

Intra-Scheme cumulative impacts

15.6.4. The findings reported in the specialist chapters have been considered. Table 15-2 highlights the impact interactions between environmental topics that are generally most likely to yield the potential for intra-Scheme cumulative effects, based on professional judgement and experience of previous comparable projects. This cross-references the specialist topics against the following groups of receptors. No distinction is made between potential construction and operation impacts.

- Air Quality.
- Biodiversity.
- Climate.
- Cultural Heritage.
- Geology and Soils.
- Landscape and Visual.
- Noise and Vibration.
- Population and Human Health.
- Road Drainage and the Water Environment.
- Materials and Waste.

15.6.5. The interaction of impacts arises from the combined action of several different environmental topic-specific impacts upon a single receptor. Table 15-2 uses blue shading to illustrate the most likely combinations of topic specific impacts that could lead to the identification of cumulative effects. The topic is along the column headings at the top and the rows have each been considered on the basis of 'could xxx changes have an impact on yyy topic'. For example, changes comprising the removal of trees to construct the Scheme (i.e. both a landscape and biodiversity change) will have a direct impact upon landscape, visual amenity and biodiversity topic receptors due to the loss of the visual feature, amenity and habitat. Furthermore, this could also have an indirect impact on the health of residential receptors in the area, by way of increasing air quality impacts.

Table 15-2 − Typical interactions of impacts between environmental topics

Topics	Air Quality	Biodiversity	Climate Change	Cultural Heritage	Geology and Soils	Landscape and Visual Amenity	Noise and vibration	Population and Human Health	Road Drainage and the Water Environment	Waste and Materials
Air Quality		■	■	■				■		
Biodiversity	■		■	■		■	■	■	■	
Climate Change	■							■	■	■
Cultural Heritage	■	■				■	■	■		
Geology and Soils								■	■	■
Landscape and Visual		■		■				■		
Noise and Vibration		■		■				■		
Population and Human Health	■	■	■	■	■	■	■			
Water Environment		■			■			■		■
Materials and Waste			■		■			■	■	

15.6.6. The CEA findings also draw on environmental design measures (as set out in the environmental design for the Scheme (Environmental Masterplan (~~application~~Application document TR010063/~~—~~APP/-2.13)) and mitigation proposals that have either already been proposed for incorporation into the Scheme (termed embedded mitigation); or have been developed from the iterative process of assessment and design to target a specific impact (essential mitigation) – the Register of Environmental Actions and Commitments (REAC) (~~application~~Application document TR010063/~~—~~APP/-7.4) indicates how each of these is to be secured. These aspects of the Scheme illustrate how it has evolved to address intra-Scheme impacts, in accordance with the mitigation hierarchy, which are often cross-topic. For example, ecological mitigation areas may target more than one species, as well as incorporate new water attenuation features – such design elements, which include the Flood Storage Area in the M5 southern quadrant, are inherently designed to address intra-Scheme cumulative impacts identified through the ecological and water environment assessments that would, in the absence of the proposals, give rise to potentially significant cumulative effects. Similarly, combined landscape and environmental design measures may target locations where, in the absence of the proposals, intra-Scheme cumulative effects on ecological and landscape resources, visual receptors and human health may potentially be significant.

15.6.7. The cross-topic intra-Scheme CEA is described in a receptor-centric manner, focusing on common receptor types and/or geographic locations where at least two different types of impacts are predicted to interact to result in effects (within topics) that could also contribute to greater or different cumulative cross-topic intra-Scheme effects. The ES structure has been developed to allow for separate sections of CEA to be written up within the specialist topic chapters, to capture in-combination cumulative impacts relative to the topic; therefore

facilitating consideration of the potential for significant cross-topic intra-Scheme in-combination cumulative impacts within the CEA chapter (Table 15-1).

Inter-project cumulative impacts

15.6.8. The inter-project CEA findings identified consider the interaction of the Scheme with short listed RFFPs, during construction, in the Scheme opening year and the operational future baseline (15 years post-opening, in 2042). This has been reviewed in the following way:

- Additive and/or in-combination impacts during construction and operation within the specialist topic area.
- Additive and/or in-combination impacts during construction and operation across two or more topic areas (cross-topic).

15.6.9. The findings of the specialist topic assessment of significant cumulative inter-project effects informs the identification of the cross-topic effects. This is achieved by correlating the predicted impacts arising from interactions with specific RFFPs and linking, where appropriate, to affected receptors and/or biophysical features. The reporting in this CEA chapter is organised by relevant RFFP, noting that in some instances the RFFP will contribute to the potentially significant cumulative effects identified; but in others, users of the RFFP may become the receptors that will experience the cumulative effects identified.

15.6.10. The long list of RFFPs is presented within Appendix 15.1: RFFP Long List (TR010063/~~–~~APP/–6.15) (Stage 1 of the methodology). The inclusion criteria for completing the screening of the long-list to generate the RFFP shortlist are provided in the relevant technical specialist chapters (Stage 2 of the methodology).

15.6.11. The short-listing process identified 30 RFFPs that could potentially result in inter-project cumulative effects (i.e. a different project interacting with the Scheme). Further consideration of timescale interaction has scoped one of these RFFPs out of detailed assessment – the safeguarded land to the west of Cheltenham, immediately adjoining the West Cheltenham Development Area, identified in the JCS – this is on the basis that the policy cites it as potentially meeting needs beyond the JCS period and GCC has not advised of any current developer interest that would potentially accelerate delivery here.

15.6.12. The short-list of 29 RFFPs is presented in Table 15-3~~Table 15-3~~~~Table 15-3~~. This table includes the common assumptions made about the level of progression of each RFFP relative to the Scheme. The final column of the table signposts which of the specialist topics have noted the potential for the Scheme to interact with each RFFP, both in terms of the Scheme exerting an impact upon a RFFP (assuming that all embedded and essential mitigation identified within the relevant topic assessment is delivered), as well as the RFFP having an impact on the Scheme/ cumulatively with the Scheme.

15.6.13. The location of the RFFPs presented in Table 15-3 is shown in Figure 15-1.

Figure 15-1 – Reasonably foreseeable future projects with the CE study area

Figure provided in Appendix 15.2 (~~application~~Application document TR010063/~~—~~APP/-6.15)

Table 15-3 − RFFP shortlist

Development details (including planning reference)	Status and 'uncertainty' (Ref Table 2 in PINS Advice Note 17)	Approximate distance from the Order limit edge	Development in traffic model as a specific project (Y/N)	Assumptions used in assessment – progress of RFFP relative to the Scheme		Relevant topics: potential interaction noted
				Scheme construction (Apr 2025 – Dec 2027)	Scheme opening year/ operation – Dec 2027	
Either side of the M5, north of the A4019						
21/00396/CLE Address: Denhill Colmans Farm Elmstone Hardwicke Tewkesbury Gloucestershire GL51 9TG Certificate of Lawfulness to establish use of land for the siting of a mobile home for permanent residential use (use class C3) and associated garden land and vehicular parking area.	Certificate granted 19 July 2022 Tier 1	145m	N – general growth only	**Receptor** – operational residential use (1 unit)	**Receptor** – operational residential use (1 unit) at opening year	Impact of the Scheme on this development: Air quality Impact of this development on the Scheme: None
22/01377/FUL Address: Land At Manor Farm Stoke Road Stoke Orchard Cheltenham Gloucestershire GL52 7RY Erection of up to 9nos. residential properties Full Planning Application (technical details consent stage) based on granted permission in principle (ref: 21/01011/PIP) for the erection of up to 9 dwellings at Manor Farm, Stoke Orchard.	Permission in Principle granted 31st August 2022 Planning permission granted 31st May 2023 Tier 1	92m	N – general growth only	**Under construction** – residential receptor (assume up to 5 units)	**Receptor** – residential receptor Up to 5 units at **opening year** 9 units for operational future baseline (2042)	Impact of the Scheme on this development: Noise and Vibration Air Quality Population and Human Health Impact of this development on the Scheme: Population and Human Health
20/00213/FUL Address: Manor Farm Yard Stoke Road Stoke Orchard Cheltenham Gloucestershire GL52 7RY. Redevelopment of the site including demolition of existing buildings and erection of 3 No. (B1 and B8) units and associated works.	Full planning permission granted 19 March 2021 Tier 1	87m	N – general growth only	**Under construction** – employment receptor (assume up to 3 units)	**Receptor** – employment receptor (3 units) at opening year	Impact of the Scheme on this development: Noise and vibration Air quality Impact of this development on the Scheme: None
22/00549/FUL Address: Gloucester Old Spot Public House A4019 Elmstone Hardwicke Cheltenham Gloucestershire GL51 9SY Extension of existing car park, creation of motorhome parking area and addition of new access point.	Awaiting decision Tier 1	38m	N – general growth only	**Under construction** – expansion of capacity and additional access at existing business receptor	**Receptor** – expansion of capacity and additional access at existing business receptor at opening year	Impact of the Scheme on this development: Noise and vibration Population and Human Health Impact of this development on the Scheme: Population and Human Health
23/00328/OUT Address: Knightsbridge Nurseries Tewkesbury Road Elmstone Hardwicke Cheltenham Gloucestershire GL51 9SY Outline application for up to 46 affordable dwellings with all matters reserved except access.	Awaiting decision Tier 1	379m	N – general growth only	**Under construction** – residential receptor (assume up to 46 units)	**Receptor** – residential receptor (46 units) at opening year	Impact of the Scheme on this development Noise and Vibration Population and Human Health Air Quality Impact of this development on the Scheme: Population and Human Health

Development details (including planning reference)	Status and 'uncertainty' (Ref Table 2 in PINS Advice Note 17)	Approximate distance from the Order limit edge	Development in traffic model as a specific project (Y/N)	Assumptions used in assessment – progress of RFFP relative to the Scheme		Relevant topics: potential interaction noted
				Scheme construction (Apr 2025 – Dec 2027)	Scheme opening year/ operation – Dec 2027	
Gloucestershire Waste Core Strategy[4] Wingmoor Farm East, a strategic waste management development site. Address: Wingmoor Farm East, Orchard Rd, Bishops Cleeve, Cheltenham GL52 7DG, United Kingdom	Allocated in the Waste Core Strategy – Policy WCS6 Tier 3	2.2km	Y – as part of the traffic forecasting model for planning policy /strategic growth in the Joint Core Strategy	**Receptor** – waste management site. Subject to the outcome of a judicial review on the planning permission which was granted in September 2011 for landfill operations to run until 2029.	**Receptor** – waste management site at opening year	Impact of the Scheme on this development: None Impact of this development on the Scheme: Air quality
Gloucestershire Waste Core Strategy The Park, a strategic waste management development site. Address: Unit 6, The Aerodrome, Stoke Rd, Cheltenham GL52 7RS, United Kingdom	Allocated in the Waste Core Strategy – Policy WCS6 Tier 3	1.5km	Y – as part of the traffic forecasting model for planning policy /strategic growth in the Joint Core Strategy	**Receptor** – waste management site. Subject to the outcome of a judicial review on the planning permission which was granted in September 2011 for landfill operations to run until 2029.	**Receptor** – waste management site at opening year	Impact of the Scheme on this development: None Impact of this development on the Scheme: Air quality
Gloucestershire Waste Core Strategy Wingmoor Farm West, a strategic waste management development site. Address: Lowdilow Ln, Cheltenham GL52 7RS, United Kingdom	Allocated in the Waste Core Strategy – Policy WCS6 Tier 3	1.6km	Y – as part of the traffic forecasting model for planning policy /strategic growth in the Joint Core Strategy	**Receptor** – waste management site. Subject to the outcome of a judicial review on the planning permission which was granted in September 2011 for landfill operations to run until 2029.	**Receptor** – waste management site at opening year	Impact of the Scheme on this development: None Impact of this development on the Scheme: Air quality
20/00003/FUL Address: The Old School House Stoke Road Stoke Orchard Cheltenham Gloucestershire GL52 7RY Erection of a replacement residential property (amended)	Planning permission granted 27th September 2021 Tier 1	253m	N – general growth only	**Receptor** – residential receptor (1 unit)	**Receptor** – residential receptor (1 unit) at opening year	Impact of the Scheme on this development: Population and Human Health Noise and Vibration Impact of this development on the Scheme: None
Either side of the B4634						

[4] Gloucestershire County Council. November 2012. Gloucestershire Waste Core Strategy. Available at: adopted_wcs_211112-53886.pdf (gloucestershire.gov.uk)

Development details (including planning reference)	Status and 'uncertainty' (Ref Table 2 in PINS Advice Note 17)	Approximate distance from the Order limit edge	Development in traffic model as a specific project (Y/N)	Assumptions used in assessment – progress of RFFP relative to the Scheme		Relevant topics: potential interaction noted
				Scheme construction (Apr 2025 – Dec 2027)	Scheme opening year/ operation – Dec 2027	
19/00937/PDAD Address: The Barn Hayden Lane Boddington Cheltenham Gloucestershire GL51 0SR Prior approval for conversion of agricultural buildings into 1no. larger residential property (use class C3) and associated building operations. (Re-submission of previously approved application 19/00342/PDAD for amendments to fenestration to facilitate a first floor).	Prior approval granted 15th November 2019 Tier 1	96m	N – general growth only	**Receptor** – residential receptor (1 unit)	**Receptor** – residential receptor (1 unit) at opening year	Impact of the Scheme on this development: Biodiversity Noise and Vibration Population and Human Health Air quality Impact of this development on the Scheme: Biodiversity Water
19/00907/PDAD Address: A & B Buildings At Pilgrove Farm Pilgrove Farm B4634 Boddington Cheltenham Gloucestershire GL51 0SW Prior approval for conversion of agricultural buildings into 2no. larger residential properties (use class C3) and associated building operations.	Prior approval granted 15th November 2019 Tier 1	281m	N – general growth only	**Receptor** – residential receptor (2 units)	**Receptor** – residential receptor (2 units) at opening year	Impact of the Scheme on this development: Biodiversity Landscape Noise and Vibration Population and Human Health Air quality Impact of this development on the Scheme: Biodiversity Water
22/02172/FUL Address: Pilgrove Cottage, Old Gloucester Road, Cheltenham, Gloucestershire, GL51 0SW Proposed development of 4 detached 5-bedroom houses with internal garages, 3 external parking spaces and external landscaping.	Full planning permission granted 24th March 2023 Tier 1	432m	N – general growth only	**Under construction** leading to **Receptor** – Construction programme not available, so temporal overlap in construction is assumed, with receptor present before conclusion of Scheme construction – residential receptor (4 units)	**Receptor** – residential receptor (4 units) at opening year.	Impact of the Scheme on this development: Biodiversity Landscape Noise and Vibration Population and Human Health Air quality Impact of this development on the Scheme: Biodiversity Water

Development details (including planning reference)	Status and 'uncertainty' (Ref Table 2 in PINS Advice Note 17)	Approximate distance from the Order limit edge	Development in traffic model as a specific project (Y/N)	Assumptions used in assessment – progress of RFFP relative to the Scheme		Relevant topics: potential interaction noted
				Scheme construction (Apr 2025 – Dec 2027)	Scheme opening year/ operation – Dec 2027	
20/02132/FUL Address: Warners Of Cheltenham Blaisdon Way Cheltenham Gloucestershire GL51 0WH Erection of 12 no. business incubator units with flexible B2, B8, E(a)(c)(e) and (g) use.	Planning permission granted 2nd July 2021 Tier 1	203m	N – general growth only	**Receptor** – assumed fully built out business receptor (12 units) Note that as at 2022, development already partly built and includes a gym and campervan business. These two operational premises are reflected in the baseline for relevant technical assessments; with the whole development retained as an RFFP.	**Receptor** – business receptor (12 units) at opening year	Impact of the Scheme on this development: Noise and Vibration Population and Human Health Impact of this development on the Scheme: Biodiversity Water Noise and Vibration Population and Human Health Air quality
21/02832/OUT Lansdown Industrial Estate, Gloucester Road, Cheltenham, Gloucestershire Outline application for the redevelopment of the northern part of Lansdown industrial estate for up to 215 dwellings with associated access roads, parking and public open space following the demolition of the existing buildings. All matters reserved except for access. Relates to land allocated under Policy H2 of the Cheltenham Local Plan.	Awaiting decision Tier 1 Allocated in the Cheltenham Local Plan (Policy H2) Tier 3	1700m (included due to potential to interact with changes to traffic flows on the wider road network)	N – general growth only	**Under construction** leading to **Receptor** – Construction programme not available, so temporal overlap in construction is assumed, with receptor partially present before conclusion of Scheme construction – residential receptor (25% = 54 units)	**Receptor** – residential receptor Up to 54 units at **opening year** 215 units for operational future baseline (2042)	Impact of the Scheme on this development: Population and Human Health Impact of this development on the Scheme Noise and Vibration Population and Human Health Air Quality

Development details (including planning reference)	Status and 'uncertainty' (Ref Table 2 in PINS Advice Note 17)	Approximate distance from the Order limit edge	Development in traffic model as a specific project (Y/N)	Assumptions used in assessment – progress of RFFP relative to the Scheme		Relevant topics: potential interaction noted
				Scheme construction (Apr 2025 – Dec 2027)	Scheme opening year/ operation – Dec 2027	
Either side of A4019						
22/01272/FUL Address: Pigeon House Farm The Green Uckington Cheltenham Gloucestershire GL51 9SR Full application for the removal of an agricultural building and the erection of 4 residential properties and associated access (reserved matters application to ref: 18/01218/OUT - permitted 20 March 2020) (permitted 16 Sep 2022) Proposed development of 4 detached 5-bedroomed houses with internal garages. 3 external car parking spaces and external landscaping (permitted 24 Mar 2023) Minor amendment to approved proposals for Site Plan & Units 3/4 only, updating layout and external appearance in accordance with included revised plans and elevations and discharge of condition 1 of 22/00466/FUL.	Planning permission granted 16 Sep 2022 (22/00466/FUL) and 24 Mar 2023 (22/01272/FUL) Tier 1	61m	N – general growth only	**Receptor** – residential receptor (4 units)	**Receptor** – residential receptor (4 units) at opening year	Impact of the Scheme on this development: Biodiversity Water Landscape Noise and vibration Air quality Population and human health Impact of this development on the Scheme: Biodiversity Water
22/01163/FUL Address: Uckington Farm, The Green, Uckington, Cheltenham, Gloucestershire, GL51 9SR Demolition of agricultural buildings and erection of 16 dwellings, creation of access, landscaping and associated works.	Awaiting decision Tier 1	Adjacent	N – general growth only	**Under construction** leading to **Receptor** – application is not yet approved and a number of access comments have been made by GCC highways in its statutory response. On a precautionary basis (assuming approval), temporal overlap in construction is assumed, with the receptor present before conclusion of Scheme construction. 16 residential units.	**Receptor** – built out to form residential receptor (16 units) at opening year.	Impact of the Scheme on this development: Biodiversity Water Landscape Noise and vibration Air quality Population and human health Impact of this development on the Scheme: Biodiversity Water Noise and vibration Air Quality Population and Human Health

Development details (including planning reference)	Status and 'uncertainty' (Ref Table 2 in PINS Advice Note 17)	Approximate distance from the Order limit edge	Development in traffic model as a specific project (Y/N)	Assumptions used in assessment – progress of RFFP relative to the Scheme		Relevant topics: potential interaction noted
				Scheme construction (Apr 2025 – Dec 2027)	Scheme opening year/ operation – Dec 2027	
16/02000/OUT Elms Park North-west Cheltenham Off the A4019, Uckington Outline application for up to 4,115 new homes providing a range and choice of mix and tenure. North West Cheltenham Development Area: Policy A4 of the Joint Core Strategy applies to the same parcel of land – 4285 homes and 10ha office park and 13 ha of predominantly non-B class employment (to include retail, healthcare and community facilities)	Awaiting decision Tier 1 (but note that this is outline consent only – reserved matters application would need to be approved subsequently) Allocation in the Joint Core Strategy Tier 3	Part of the site is within the Order limits.	Y – as part of the traffic forecasting model for planning policy /strategic growth in the Joint Core Strategy	**Under construction** – development is dependent upon transport infrastructure improvements, which are to be delivered by the Scheme. Construction overlap anticipated in terms of enabling works and some infrastructure works. Assumption that no residential receptors will be present. Elms Park development documentation includes proposed connections between the scale of development that can proceed, relative to the progression of the Scheme.	**Under construction** – at opening year. Assumption that a small proportion of residential receptors may be present (20 homes). **Receptor – at operational future baseline (2042).** Assume that the full balance of residential receptors (4115 units) and commercial receptors (23 ha. business development predominantly non-B class employment (to include retail, healthcare and community facilities)) would be operational.	Impact of the Scheme on this development: Heritage Biodiversity Water Geology and Soils Materials and Waste Landscape Noise and Vibration Population and Human Health Air Quality Impact of this development on the Scheme: Heritage Biodiversity Water Geology and Soils Materials and Waste Landscape Noise and Vibration Population and Human Health Air Quality

Development details (including planning reference)	Status and 'uncertainty' (Ref Table 2 in PINS Advice Note 17)	Approximate distance from the Order limit edge	Development in traffic model as a specific project (Y/N)	Assumptions used in assessment – progress of RFFP relative to the Scheme		Relevant topics: potential interaction noted
				Scheme construction (Apr 2025 – Dec 2027)	Scheme opening year/ operation – Dec 2027	
20/00759/FUL Address: Elms Park A4019 Cheltenham Gloucestershire Swindon Farm Development: Demolition of a residential property and erection of new residential development (Use Class C3), new vehicular and pedestrian access off Manor Road, attenuation basin and ancillary infrastructure. 266 homes. This application relates to a parcel of land within the North West Cheltenham Development Area: Policy A4 of the Joint Core Strategy applies to the same parcel of land – 4285 homes and 10ha office park and 13 ha of predominantly non-B class employment (to include retail, healthcare and community facilities)	Planning permission granted, 2nd June 2023 Tier 1 Allocation in the Joint Core Strategy Tier 3	258m	Y – as part of the traffic forecasting model for planning policy /strategic growth in the Joint Core Strategy	Some **Receptors** and some **Under construction** leading to **Receptor** – development is partly dependent upon transport infrastructure improvements, which are to be delivered by the Scheme. The landscape phasing plan included within the planning application indicates a three year programme of works leading to final landscaping works. Time will be required for conditions associated with the planning consent to be met. It is therefore assumed that RFFP construction may be from 2024 – 2028. This means that construction overlap is anticipated in terms of enabling works and several phases of development. Assumption that up to 25% of homes may be occupied at commencement of Scheme construction (c.66 homes), rising to 75% (c.200 homes) by conclusion of construction.	**Receptor**, with some **under construction** – at opening year – assumption that around 75% of units (c.200 homes) will be occupied at opening year. **Receptor – operational future baseline (2042)** – assumption that all residential properties will be occupied (266 homes).	Impact of the Scheme on this development: Biodiversity Heritage Geology and Soils Materials and Waste Landscape Noise and Vibration Population and Human Health Impact of this development on the Scheme: Air Quality Biodiversity Heritage Water Geology and Soils Noise and Vibration Population and Human Health
19/00113/COU Carpetright Plc Unit M Gallagher Retail Park A4019 Cheltenham Gloucestershire GL51 9RR Change of use of Unit M from Class A1 (retail) to Class D2 (Leisure & Assembly) to create a gym	Planning permission granted 21st March 2019 Tier 1	230m	N – general growth only	**Receptor** – business receptor (1 gym unit)	**Receptor** – business receptor (1 gym unit) at opening year	Impact of the Scheme on this development: Population and Human Health Impact of this development on the Scheme: Population and Human Health Air Quality

Development details (including planning reference)	Status and 'uncertainty' (Ref Table 2 in PINS Advice Note 17)	Approximate distance from the Order limit edge	Development in traffic model as a specific project (Y/N)	Assumptions used in assessment – progress of RFFP relative to the Scheme		Relevant topics: potential interaction noted
				Scheme construction (Apr 2025 – Dec 2027)	Scheme opening year/ operation – Dec 2027	
19/01260/OUT Address: Land north-west Manor Road Runnings Road Cheltenham Gloucestershire Outline application for the construction of light industrial units (use class B1) including the creation of a vehicular access point, with all other matters reserved for future consideration	Planning permission granted 10th December 2019 Tier 1	470m	N – general growth only	**Under construction** leading to **Receptor** – application is outline. Reserved matters would be required, so temporal overlap in construction is assumed, with **receptor** present before conclusion of Scheme construction – business receptor (B1 light industrial units)	**Receptor** – business receptor (B1 light industrial units) at opening year	Impact of the Scheme on this development: Population and Human Health Geology and Soils Impact of this development on the Scheme: Water Population and Human Health Air Quality Geology and Soils
17/01459/FUL and 17/00827/FUL (same application made to two authorities – TBC and CBC) Address: Gallagher Retail Park A4019 Cheltenham Gloucestershire Erection of a Class A1 retail unit comprising 929 sqm at ground floor with full cover mezzanine, car parking, re-alignment of service yard access, renewal / adjustment of service yard drainage, diversion of a Class 5 highway, and associated works to the west of Unit A Gallagher Retail Park.	Planning permission granted 19th December 2017 Tier 1	Part of the site is within the Order limits.	N – general growth only	**Receptor** – business receptor (1 retail unit)	**Receptor** – business receptor (1 retail unit) at opening year	Impact of the Scheme on this development: Geology and Soils Population and Human Health Landscape Impact of this development on the Scheme: Water Geology and Soils Noise and Vibration Population and Human Health Air quality Landscape
21/02120/FUL Address: Gallagher Retail Park A4019 Cheltenham Gloucestershire Erection a restaurant unit with drive-through lane and associated car parking, layout and landscaping amendments.	Planning permission granted 24th March 2022 Tier 1	73m	N – general growth only	**Receptor** – business receptor (1 take away/ restaurant)	**Receptor** – business receptor (1 take away/ restaurant)	Impact of the Scheme on this development: Geology and Soils Population and Human Health Impact of this development on the Scheme: Geology and Soils Water Noise and Vibration Population and Human Health Air Quality

Development details (including planning reference)	Status and 'uncertainty' (Ref Table 2 in PINS Advice Note 17)	Approximate distance from the Order limit edge	Development in traffic model as a specific project (Y/N)	Assumptions used in assessment – progress of RFFP relative to the Scheme		Relevant topics: potential interaction noted
				Scheme construction (Apr 2025 – Dec 2027)	Scheme opening year/ operation – Dec 2027	
22/00164/PIP Address: Land Known as Evergreen Spiritual Pathways The Green Uckington Cheltenham Gloucester GL51 9SS Permission in principle application for the erection of up to 3 residential properties	Permission granted 26 July 2022 Tier 1	150 m	N – general growth only	**Under construction** leading to **Receptor** – application is approval in principle. Technical details to be developed and approved and construction programme not available, so temporal overlap in construction is assumed, with **receptor** partially present before conclusion of Scheme construction – residential receptor (up to 3 units)	**Receptor** – residential receptor (3 units) at opening year	Impact of the Scheme on this development: Air Quality Water Landscape Noise and vibration Population and human health Impact of this development on the Scheme: Water Noise and vibration
23/00354/OUT Home Farm, Quat Goose Lane, Cheltenham, Gloucestershire, GL51 9RP Outline application for the erection of up to 180 residential units, including provision of vehicular and pedestrian access, green infrastructure and associated works. Appearance, landscaping, layout and scale are matters reserved for future consideration. This application relates to a parcel of land within the North West Cheltenham Development Area: Policy A4 of the Joint Core Strategy applies to the same parcel of land – 4,285 homes and 10ha office park and 13 ha of predominantly non-B class employment (to include retail, healthcare and community facilities).	Awaiting decision Tier 1 Allocation in the Joint Core Strategy Tier 3	1138 m (~~included~~Included due to potential to interact with changes to traffic flows on the wider road network and inclusion within the strategic development site of Policy A4)	N – general growth only	**Under construction** leading to **Receptor** – application is outline and not yet approved. Technical details to be developed and approved and construction programme not available, so temporal overlap in construction is assumed, with **receptor** partially present before conclusion of Scheme construction – residential receptor (up to 25% = 45 units)	**Receptor** – residential receptor (45 units) at opening year **Receptor – operational future baseline (2042)** – assumption that all residential properties will be occupied (180 homes).	Impact of the Scheme on this development: Population and Human Health Impact of this development on the Scheme: Noise and Vibration Air Quality Population and Human Health

Development details (including planning reference)	Status and 'uncertainty' (Ref Table 2 in PINS Advice Note 17)	Approximate distance from the Order limit edge	Development in traffic model as a specific project (Y/N)	Assumptions used in assessment – progress of RFFP relative to the Scheme		Relevant topics: potential interaction noted
				Scheme construction (Apr 2025 – Dec 2027)	Scheme opening year/ operation – Dec 2027	
22/00474/FUL Address: Douglas Equipment Village Road Cheltenham Gloucestershire GL51 0AB Demolition of existing buildings and erection of 71 residential properties, including access, car parking, landscaping and associated works	Permission granted 26 September 2022 Tier 1	264m	N – general growth only	**Under construction** leading to **Receptor** – application is not associated with discharge of condition applications, so temporal overlap in construction is assumed, with **receptor** partially present before conclusion of Scheme construction – residential receptor (up to 25% (18 units))	**Receptor** – partially built out to form residential receptor (18 units) at opening year and some **under construction.** **Receptor** – fully built out (71 residential units) at **operational future baseline** (2042)	Impact of the Scheme on this development: Noise and vibration Population and Human Health Impact of this development on the Scheme: Noise and vibration Population and Human Health Air quality Water
22/00947/FUL Hayden Hill Fruit Farm Old Gloucester Road Boddington Cheltenham Gloucestershire GL51 0SW Erection of replacement dwelling following demolition of existing barn and existing bungalow	Awaiting decision Tier 1	Adjacent	N-general growth only	**Under construction** leading to **Receptor** – application is not yet determined. Construction programme not available, so temporal overlap in construction is assumed, with **receptor** partially present before conclusion of Scheme construction – residential receptor (1 unit)	**Receptor –** residential receptor (1 unit) at opening year	Impact of the Scheme on this development: Population and Human Health Biodiversity Impact of this development on the Scheme: Biodiversity

Development details (including planning reference)	Status and 'uncertainty' (Ref Table 2 in PINS Advice Note 17)	Approximate distance from the Order limit edge	Development in traffic model as a specific project (Y/N)	Assumptions used in assessment – progress of RFFP relative to the Scheme		Relevant topics: potential interaction noted
				Scheme construction (Apr 2025 – Dec 2027)	Scheme opening year/ operation – Dec 2027	
22/01817/OUT (to CBC) 22/01107/OUT (to TBC) Address: Land to the South of Old Gloucester Road (B4634), Cheltenham, Gloucestershire Outline planning application for residential development comprising a mixture of market and affordable housing (use class C3), which could include retirement/extra care accommodation (use class C2/C3) a flexible mixed-use area with a community hub (including potentially use classes E, F1 and F2) a primary school and children's nursery to include use of sports pitches to provide public recreation space, site clearance and preparation, green infrastructure, walking and cycling routes, formal and informal public open space, sports pitch provision, drainage and other associated works and infrastructure, including utilities and highways works, all matters reserved except partially for access. The Application Site is 64 hectares. The residential component totals 1100 homes with an illustrative accommodation mix supplied with a focus on three and four bedroom homes, but ranging from one bedrooms flats to five bedroomed houses. The indicative non-residential land uses comprise 450 sqm small convenience store, 250sqm of café space and co-working office space and 300 sqm of community hub elements (parcel space, community space and bookable rooms and site offices/management). This application relates to a parcel of land within the West Cheltenham Development Area, which is a JCS Allocation. Policy A7 of the JCS applies – it expects the delivery of approximately 1,100 residential homes and 45 ha. of business development, focussed on a cyber security hub. A collaborative masterplan is included in the outline application as a live document, and this indicates that CBC and development partners are expected to submit further applications for parcels of land within the east and south of the JCS allocation site, for potentially 1,500 additional homes, plus the cyberpark. This represents a substantial increase in growth over that proposed within the JCS.	Awaiting decision Tier 1 (but note that this is outline consent only – reserved matters application would need to be approved subsequently) Allocated in Joint Core Strategy Tier 3	Part of the site is within the Order limits.	Y – as part of the traffic forecasting model for planning policy /strategic growth in the Joint Core Strategy. This is based on the 1100 ~~dwellings~~ residential properties and 45 ha of business development in the JCS	**Under construction** – development is dependent upon transport infrastructure improvements, which are to be delivered by the Scheme for delivery of the primary access from the B4634. Construction overlap anticipated in terms of enabling works and some infrastructure works, focused on the north-east of the Application Site in the first instance. Assumption that no residential, community or business receptors will be present – the outline planning application has yet to be determined and thereafter a reserved matters application will need to be submitted.	**Under construction – at opening year.** Assumption that no residential, community or business receptors will be present. **Receptor – at operational future baseline (2042).** Assume that the full balance of residential receptors (1100 units) and community receptors would be operational. Additional assumption that the balance of business receptors (45 ha.) and additional residential development (potentially up to 1500 further ~~dwellings~~ residential properties – yet to be confirmed through applications) would be operational, based on the collaborative masterplan contents indicating forthcoming applications for the remainder of the land parcels within Policy A7 Strategic Site allocation.	Impact of the Scheme on this development: Heritage Biodiversity Water Materials and Waste Landscape Noise and Vibration Population and Human Health Air Quality Geology and Soils Impact of this development on the Scheme: Heritage Biodiversity Water Materials and Waste Landscape Noise and Vibration Population and Human Health Air Quality Geology and Soils

Development details (including planning reference)	Status and 'uncertainty' (Ref Table 2 in PINS Advice Note 17)	Approximate distance from the Order limit edge	Development in traffic model as a specific project (Y/N)	Assumptions used in assessment – progress of RFFP relative to the Scheme		Relevant topics: potential interaction noted
				Scheme construction (Apr 2025 – Dec 2027)	Scheme opening year/ operation – Dec 2027	
Joint Core Strategy[5] Policy SD5 – safeguarded land to the north-west of Cheltenham (north-east of M5 J10) Development for residential development. Units unspecified – 2000 residential properties assumed for purposes of CEA.	Safeguarded in Joint Core Strategy for longer term development needs beyond the JCS period (i.e. post 2031). Tier 3 Note: developer interest and representations supported by a masterplan being made through the JCS Review process.	Part of the site is within the Order limits.	Y – as part of the traffic forecasting model for planning policy /strategic growth in the Joint Core Strategy	**Under construction** – development is dependent upon transport infrastructure improvements, which is delivered by the Scheme. Construction overlap anticipated in terms of enabling works and some infrastructure works. Assumption that no residential receptors will be present.	**Under construction** – at opening year. Assumption that no residential receptors will be present. **Receptor – at operational future baseline (2042).** Assume that the full balance of residential receptors (2000 units assumed) would be operational.	Impact of the Scheme on this development: Heritage Biodiversity Water Materials and Waste Landscape Noise and Vibration Population and Human Health Air Quality Geology and Soils Impact of this development on the Scheme: Heritage Biodiversity Water Materials and Waste Landscape Noise and Vibration Population and Human Health Air Quality Geology and Soils

[5] Gloucester, Cheltenham and Tewkesbury

Development details (including planning reference)	Status and 'uncertainty' (Ref Table 2 in PINS Advice Note 17)	Approximate distance from the Order limit edge	Development in traffic model as a specific project (Y/N)	Assumptions used in assessment – progress of RFFP relative to the Scheme		Relevant topics: potential interaction noted
				Scheme construction (Apr 2025 – Dec 2027)	Scheme opening year/ operation – Dec 2027	
Phase 1 Land At Old Gloucester Road Cheltenham Gloucestershire Various successive applications for approval of reserved matters (access, appearance, landscaping, layout and scale) pursuant to outline planning permission ref. 17/01411/OUT for residential development of up to 90 dwellings, associated open space, landscaping and infrastructure, including new vehicular access to Old Gloucester Road (revised application following grant of 20/00272/REM). Details are also submitted in relation to outline conditions: 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 17, 18, 19.1, 19.2, 20, 22 and 23; and various discharge of condition applications. The revised proposals are for 85 dwellings (March 2023 scheme). This application relates to a parcel of land within a Cheltenham Plan (adopted 2020) Allocation Policy HD8 – Strategic Site – land to the north of the B4634 - Development land allocated for 175 homes (11.3ha.)	17/01411/OUT granted 15 Dec 2017 20/00036/AMEND granted 17 Jan 20 20/00272/REM approved 27 Nov 20 20/02168/DISCON approved 19 Jan 21 21/00872/REM approved 16 Jul 21 21/02502/DISCON approved 10 Dec 21 21/02716/DISCON approved 20 Jan 22 22/01208/DISCON approved 23 Aug 22 22/00392/AMEND 23/00322/AMEND approved 27 Mar 23 Allocated in the Cheltenham Local Plan –planning application submitted for south-western portion of allocated site to date Tier 3	Part of the allocated site is in the Order limits The Application Site is 311m from the Order limits at the closest point	Y – as part of the traffic forecasting model for planning policy for the Local Plan	**Under construction** leading to **receptor**– the south-western part of the allocated site is subject to a consented planning application that has been progressed through approval of reserved matters and discharge of conditions, indicating an intention to commence construction imminently. Construction overlap of the south-western part of the allocated site is anticipated in terms of enabling works and some infrastructure works, as well as the construction of homes (noting the 2 year expiration condition on the consent). Assumption that up to 50% of units will be completed during Scheme construction (43 units). The remainder of the allocated site is identified in the Local Plan as having multiple constraints that need to be resolved through ~~masterplanning~~master planning (flood risk, green belt, presence of allotment gardens, proximity of Scheduled Monument and requirement to resolve future of nurseries within the site).	**Receptor** and **Under construction** – at opening year. Assumption that 43 residential receptors will be present at opening year. Construction works for the application site anticipated to conclude early on the operational period of the Scheme – 85 residential properties. Receptor – at operational future baseline (2042). Assume that the full balance of residential receptors (175 units) would be operational and allotment gardens retained (as per Policy C13).	Impact of the Scheme on this development: Biodiversity Water Geology and soils Landscape Population and Human Health Noise and Vibration Impact of this development on the Scheme: Biodiversity Water Geology and soils Landscape Population and Human Health Air Quality

15.7. Intra-Scheme – assessment of cross-topic effects

15.7.1. The incidence and significance of individual effects arising from the Scheme have been determined in the assessments within the relevant topic chapters of the ES. The CEA has reviewed the findings of the specialist topic chapters to identify correlations between receptors assessed as experiencing adverse effects arising from the Scheme. The interaction between these effects is examined in this section.

15.7.2. Table 15-4 provides a summary of impacts for receptors that feature in more than one specialist topic assessment. A narrative is provided on the nature of resultant cumulative effects for construction and is supported by a map of 'hot-spots' at Figure 15-2. Table 15-5 provides the equivalent summary for operation, supported by an illustrative map of 'hot-spots' at Figure 15-3.

15.7.3. There is no agreed industry standard for determining the type, magnitude and significance of intra-Scheme cross-topic effects – it is a matter for professional judgement. On this basis, a narrative approach is used to describe the factors that have contributed to conclusions about an overall combined significance of the cumulative intra-Scheme effects that may arise from the impacts of all identified single-topic residual effects, working together. This reflects a characterisation of the impact that considers the duration, extent, type and frequency of the effect (as expressed with the methodology (Section 15.3) and at 15.6.2~~15.6.2~~), cross-referenced to the value and resilience of the affected receptors and the nature and likely success of embedded and essential mitigation already noted within topic chapters. Conclusions are then drawn about the magnitude of impact and significance of cumulative effects, drawing on the guidance in DMRB LA104 at Table 3.4N (Magnitude of impact and typical descriptors), Table 3.7 (Significance categories and typical descriptors) and Table 3.8.1 (Significance matrix).

15.7.4. Air quality, waste and materials and climate change topics are not represented as the technical assessments do not identify any significant residual effects arising from the Scheme in relation to the receptors noted.

Figure 15-2 – Cross-topic cumulative effects hotspots – Construction

Figure provided in Appendix 15.2 (~~application~~Application document TR010063/~~—~~APP/~~-~~6.15)

Figure 15-3 – Cross topic cumulative effect hotspots – Operation

Figure provided in Appendix 15.2 (~~application~~Application document TR010063/~~—~~APP/~~-~~6.15)

Table 15-4 – Intra-Scheme cumulative effects between topics on receptor groups – Construction

Receptor	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Population and Human Health	Road Drainage and the Water Environment	Mitigation
North and south Uckington (to the north and south of the A4019) includes Buildings at Moat House and other properties on Moat Lane.	N/A – single project effect not applicable to this topic	Construction activities may indirectly impact the settings of heritage assets (Moat House Moated Site SM and other Moat properties) through disruptions that limit or prevent the significance of the asset being appreciated. This will result in **slight adverse and not significant residual effect.**	N/A – single project effect not applicable to this topic	During the construction of the Scheme, properties along Moat Lane will temporarily experience a **moderate adverse but not significant residual effect**[6] mainly due to the loss of screening vegetation, proximity to works and consequent intrusion on views.	N/A – single project effect not applicable to this topic	During construction, the key characteristics of the settlement of Uckington will experience **moderate adverse and significant residual effects** mainly due to the introduction of the construction activities as a dominant and urbanising feature. The noise and landscape impacts would be associated with a **negative health outcome,** which have been assessed as combining to form a **moderate adverse and significant residual effect** on landscape amenity in relation to human health. Impacts on access to facilities, services and assets that support physical and mental health and well-being have been assessed as a **moderate adverse and significant residual effect** on human health. Changes to noise and characteristics of the transport network within Uckington due to temporary increases in through traffic arising from the M5 J10 slip road closures have been assessed as a **moderate adverse and significant residual effect** on human health.	N/A – single project effect not applicable to this topic	No additional mitigation has been identified above the measures as outlined in the relevant topic chapters (Chapter 9 – Landscape and Visual (~~application~~Application document TR010063/~~–~~APP/6.7) and Chapter 11 – Cultural Heritage (~~application~~Application document TR010063/~~-~~APP/6.9)), within the Environmental Management Plan (1st iteration) (~~application~~Application document TR010063/~~–~~APP/~~-~~7.3) and the REAC (~~application~~Application document TR010063/~~–~~APP/~~-~~7.4).
	Summary of cumulative effects							

[6] The DMRB methodology for the landscape and visual assessment requires professional judgement to be exercised when determining whether an assessment of moderate adverse effects should be considered significant or not significant. This is explained within the contributing technical assessment chapter (application document TR010063 – APP 6.7)

Receptor	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Population and Human Health	Road Drainage and the Water Environment	Mitigation
	The receptor comprises a combination of residential properties and historic assets. The combined effects relate to visual impacts of construction activities and increased perception of construction noise (below thresholds of significance for noise and landscape assessment, but relevant to health outcomes (particularly when noting that the human health baseline accounts for planned development, which includes the redevelopment of Uckington Farm) and leading to significant adverse residual effects on human health) – vegetation will be lost and construction will be experienced as intrusive both visually and in terms of noise, for residents and visitors, also affecting the overall character of the settlement. The noise impacts and landscape impacts of construction activities will endure for up to 24 months and will be temporary. The landscape impacts from vegetation clearance endure into the operational phase, as do the changes to the character of the settlement, so will be permanent/evolving. The disruptive impacts of the construction activities on daily patterns of movements of these residents are assessed as resulting in significant adverse residual effects on human health. The sensitivity assessment of the impacts of the M5 J10 slip road closures hase concluded that there is the potential for increases in through traffic that will change noise levels and characteristics of the transport network within Uckington, adding to the effects on the character of the settlement. The cumulative construction effect of the Scheme on the receptor is considered to be adverse. The effects of disruption will be temporary, lessening over time; the geographical extent of the effect relates to a small part of the study area, at Uckington and extending southwards to include Moat House; the type of effect is in-combination (different effects combining to generate an amenity effect); the visual effects will lessen over time; the noise effects will alter in magnitude and characteristics during the construction works; the affected receptors are noted as sensitive to change. The essential mitigation noted for the population and human health effects includes targeted and interactive engagement with members of the community of Uckington that aims to lessen adverse effects of reduced amenity and disruption. The essential mitigation also includes prescriptive expectations relating to the role of a Public Liaison Officer (PLO) and development and implementation of a Community Engagement Plan (CEP) to provide information, support and a route for consultation activities to be altered in response to any issues arising, and this is taken into account in the cumulative effects assessment.. The intra-Scheme cumulative effect on these receptors is assessed as minor adverse and not significant, except during the period of the construction phase when the M5 Junction 10 slip road closures are in place. The cumulative effects while the M5 Junction 10 slip road closures and signed diversions are in place are assessed, on a precautionary basis, as moderate adverse and significant. Additional essential mitigation has been identified for the management of cumulative effects from traffic diverted, or seeking to deviate from the signed diversion routes during the period that the M5 J10 slip roads are closed, including measures to discourage HDV through movements on local roads. The residual CEA is moderate adverse and significant.							
House in the Tree Public House	N/A – single project effect not applicable to this topic.	N/A – single project effect not applicable to this topic.	N/A – single project effect not applicable to this topic.	During construction, there will be a loss of roadside hedges and trees, the House in the Tree will lose some of its frontage grounds and the new road will be visible to properties around the junction. This will result in a **significant large adverse residual effect**.	During construction the House in the Tree will experience a **significant adverse residual effect** from the noise generated from earthworks and pavement works	During construction, access to the House in the Tree Public House at the Junction will be temporarily reduced. The impact will be slight adverse and not significant. The noise and landscape impacts would be associated with a negative health outcome, which have been assessed as combining to form a **large adverse and significant residual effect** on human health for the larger cluster of businesses of which this receptor is part. Impacts on access to the receptor, for employers, employees and patrons will be subject to disruption and the assessment has identified a **moderate adverse and significant residual effect** on human health.	N/A – single project effect not applicable to this topic.	No additional mitigation has been identified above the measures as outlined in the relevant topic chapters (Chapter 9 – Landscape and Visual (TR010063/–APP/ 6.7); Chapter 11 – Cultural Heritage (TR010063/-APP/ 6.9) and Chapter 13 – Population and Human Health (TR010063/—APP/ 6.11)) and within the Environmental Management Plan (1st iteration) (TR010063/—APP/-7.3) and the REAC (TR010063/—APP/-7.4).
	Summary of cumulative effects							

Receptor	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Population and Human Health	Road Drainage and the Water Environment	Mitigation
	The receptor comprises a Public House business, supporting a broad customer base. The combined effects relate to visual impacts of construction activities and increased perception of construction noise as well as impacts on access due to the traffic management that is expected to start close to the Public House entrance and extend eastwards– vegetation will be lost and construction will be experienced as intrusive both visually and in terms of noise, for the proprietors, staff and customers, potentially deterring some passing trade. The noise, landscape and access impacts of construction activities will endure for up to 24 months and will be temporary. The landscape impacts from vegetation clearance endure into the operational phase, so will be permanent. The cumulative construction effect of the Scheme on the receptor is considered to be adverse. The effects of disruption to access from traffic management will be temporary and end once construction is finished; the landscape impacts will lessen over time; the geographical extent of the effect relates to a very small part of the study area, at the affected property; the type of effect is in-combination (different effects combining to generate an amenity effect and disruption effect); the visual effects will lessen over time; the noise effects will alter in magnitude and characteristics during the construction works; the affected receptor is not residential and is therefore more resilient to change. The essential mitigation noted for the population and human health effects includes targeted and interactive engagement with directly affected business owners, includes prescriptive expectations relating to the role of a PLO and development and implementation of a CEP to provide information, support and a route for consultation activities to be altered in response to any issues arising, that aims to lessen adverse effects of reduced amenity and disruption and this is taken into account in the cumulative effects assessment. The intra-Scheme cumulative effect on this receptor is assessed as minor adverse and not significant. No additional essential mitigation for cumulative effects is proposed. The residual CEA is minor adverse and not significant.							
Stanboro Cottage	N/A – single project effect not applicable to this topic	N/A – single project effect not applicable to this topic	N/A – single project effect not applicable to this topic	The removal of vegetation and construction works will impact the views from Stanboro Cottage and result in a **moderate adverse but not significant residual effect**.	During construction, Stanboro Cottage will experience a **significant adverse residual effect** from the noise generated from earthworks, drainage and pavement and planning works.	During construction, there will be temporary disruptions to access to Stanboro Cottage resulting in a **slight adverse residual effect, which is not significant.** The noise and landscape impacts would be associated with a **negative health outcome**, which have been assessed as combining to form a **very large adverse and significant residual effect** on human health on the residential receptor cluster of which Stanboro Cottage is part (and **large adverse and significant residual effect** on human health relating to employers and employees of the business cluster). Demolitions of properties within this community have also been assessed as producing a **very large adverse and significant residual effect** on human health**.**	N/A – single project effect not applicable to this topic	No additional mitigation has been identified above the measures as outlined in the relevant topic chapters (Chapter 9 – Landscape and Visual (~~application~~Application document TR010063/~~–~~APP/6.7); Chapter 11 – Cultural Heritage (~~application~~Application document TR010063/~~-~~APP/6.9) and Chapter 13 – Population and Human Health (~~application~~Application document TR010063/~~–~~APP/~~-~~6.11)) and within the Environmental Management Plan (1st iteration) (~~application~~Application document TR010063/~~–~~APP/~~-~~7.3) and the REAC (~~application~~Application document TR010063/~~–~~APP/~~-~~7.4).
	Summary of cumulative effects							

Receptor	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Population and Human Health	Road Drainage and the Water Environment	Mitigation
	The receptor comprises a residential property and fish farm business. The combined effects relate to visual impacts of construction activities, property demolition in proximity and increased perception of construction noise as well as impacts on access due to the traffic management that is expected to start close to the receptor accesses and extend eastwards – vegetation will be lost and construction will be experienced as intrusive both visually and in terms of noise, for the residents, proprietors, staff and customers, potentially deterring some passing trade from the businesses. The noise, landscape and access impacts of construction activities will endure for up to 24 months and will be temporary. The landscape impacts from vegetation clearance endure into the operational phase, but replacement planting is proposed within the Scheme. The cumulative construction effect of the Scheme on the receptor is considered to be adverse. The effects of disruption to access from traffic management will be temporary and end once construction is finished; the landscape impacts will lessen over time; the geographical extent of the effect relates to a very small part of the study area, at the affected property; the type of effect is in-combination (different effects combining to generate an amenity effect and disruption effect); the visual effects will lessen over time; the noise effects will alter in magnitude and characteristics during the construction works; the affected receptor includes residents, who are more sensitive to change, particularly in relation to changes to the environs due to demolition. The essential mitigation noted for the population and human health effects includes targeted and interactive engagement with directly affected residents and business owners, includes prescriptive expectations relating to the role of a PLO and development and implementation of a CEP to provide information, support and a route for consultation activities to be altered in response to any issues arising, that aims to lessen adverse effects of reduced amenity and disruption and this is taken into account in the cumulative effects assessment. The intra-Scheme cumulative effect on this receptor is assessed as minor adverse and not significant. No additional essential mitigation for cumulative effects is proposed. The residual CEA is minor adverse and not significant.							
Gloucester Old Spot Public House	N/A – single project effect not applicable to this topic	N/A – single project effect not applicable to this topic	N/A – single project effect not applicable to this topic	The Gloucester Old Spot Public House will experience adverse impacts on views, but since this receptor is less sensitive within the method, this is **not a significant residual effect**	During construction, The Gloucester Old Spot Public House will experience adverse noise effects, but since this receptor is less sensitive within the method, this is **not a significant residual effect**	During construction, there will be temporary disruptions to access to the Gloucester Old Spot Public House resulting in a **slight adverse residual effect, which is not significant.** The noise and landscape impacts would be associated with a **negative health outcome,** which have been assessed as combining to form a **large adverse and significant residual effect** on human health relating to employers and employees of the business cluster that the receptor is a part of. Impacts on access to the receptor, for employers, employees and patrons will be subject to disruption and the assessment has identified a **moderate adverse and significant residual effect** on human health.	N/A – single project effect not applicable to this topic	No additional mitigation has been identified above the measures as outlined in the relevant topic chapters (Chapter 9 – Landscape and Visual (~~application~~Application document TR010063/~~–~~APP/6.7); Chapter 11 – Cultural Heritage (~~application~~Application document TR010063/~~-~~APP/6.9) and Chapter 13 – Population and Human Health (~~application~~Application document TR010063/~~–~~APP/~~-~~6.11)) and within the Environmental Management Plan (1st iteration) (~~application~~Application document TR010063/~~–~~APP/~~-~~7.3) and the REAC (~~application~~Application document TR010063/~~–~~APP/~~-~~7.4).
	Summary of cumulative effects							

Receptor	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Population and Human Health	Road Drainage and the Water Environment	Mitigation
	The receptor comprises a Public House business, supporting a broad customer base. The combined effects relate to visual impacts of construction activities and increased perception of construction noise as well as impacts on access due to the traffic management that is expected to start close to the receptor accesses and extend eastwards – vegetation will be lost and construction will be experienced as intrusive both visually and in terms of noise, for the residents, proprietors, staff and customers, potentially deterring some passing trade from the businesses. The noise, landscape and access impacts of construction activities will endure for up to 24 months and will be temporary. The landscape impacts from vegetation clearance endure into the operational phase, but replacement planting is proposed within the Scheme. The cumulative construction effect of the Scheme on the receptor is considered to be adverse. The effects of disruption to access from traffic management will be temporary and end once construction is finished; the landscape impacts will lessen over time; the geographical extent of the effect relates to a very small part of the study area, at the affected property; the type of effect is in-combination (different effects combining to generate an amenity effect and disruption effect); the visual effects will lessen over time; the noise effects will alter in magnitude and characteristics during the construction works; the affected receptor is a business, which is a land use type that is more resilient to change. The essential mitigation noted for the population and human health effects includes targeted and interactive engagement with directly affected business owners, includes prescriptive expectations relating to the role of a PLO and development and implementation of a CEP to provide information, support and a route for consultation activities to be altered in response to any issues arising, that aims to lessen adverse effects of reduced amenity and disruption and this is taken into account in the cumulative effects assessment. The intra-Scheme cumulative effect on this receptor is assessed as minor adverse and not significant. No additional essential mitigation for cumulative effects is proposed. The residual CEA is minor adverse and not significant.							
M5J10 Northern Quadrant includes Stanboro Lane	During construction, there will be the loss of some terrestrial habitats in the immediate vicinity of the existing M5 Junction 10 and motorway verges, resulting in a **minor adverse residual effect**.	N/A – single project effect not applicable to this topic	N/A – single project effect not applicable to this topic	During construction, occupiers of Sheldon Cottages, which is within this receptor cluster, are expected to experience **very large adverse significant residual effects** given the extensive construction activities proposed directly outside the properties.	During construction, Sheldon Cottages and Stanboro Cottage, which are within this receptor cluster, will experience **moderate and major adverse residual effects** during the day and night from the noise generated from earthworks, stockpiling, pavement and planing and bridgeworks and drainage. The cottages will also experience **moderate adverse residual effects** associated with construction vibration.	During the construction, there will be permanent land take and loss of properties adjacent to Sheldon Nurseries and at Withybridge Gardens. Two semi-detached residential properties will remain – Sheldon Cottages. The demolition, land take and construction impacts on the residents of these retained properties, including disruption to property access, will result in a **moderate adverse and significant effect** in relation to the key characteristics of their environment**.** The residents of the two remaining residential properties will experience a substantial decrease in amenity due to the noise, changes to the landscape, including demolition of neighbouring properties and interruption to access. This will result in **negative health outcomes**, which have been assessed as combining to form a **very large adverse and significant residual effect** in relation to human health.	N/A – single project effect not applicable to this topic	No additional mitigation has been identified above the measures as outlined in the relevant topic chapters (Chapter 7 - Biodiversity (~~application~~Application document TR010063/~~–~~ APP/-6.5) and Chapter 13 – Population and Human Health (~~application~~Application document TR010063/~~–~~ APP/-6.11)) and within the Environmental Management Plan (1st iteration) (~~application~~Application document TR010063/~~–~~ APP/-7.3) and the REAC (~~application~~Application document TR010063/~~–~~ APP/-7.4). Properties subject to demolition will require compensation, which falls outside the scope of the ES.
	Significance of cumulative effects							

Receptor	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Population and Human Health	Road Drainage and the Water Environment	Mitigation
	The receptor comprises a combination of biodiversity assets and residential properties. The combined effects relate to loss of some terrestrial habitats, building demolition, increased perception of construction noise – vegetation (habitats) will be lost and construction will be experienced as intrusive both visually and in terms of noise, for remaining residents, affecting the overall character of the area. The noise impacts and landscape impacts of construction activities, together with disruption to access to retained properties will endure for up to 24 months and will be temporary. The vegetation clearance will make way for substantial earthworks and formation of new embankments close to the retained residential properties, which will start to be planted during construction. The landscape impacts will therefore be permanent/evolving. The cumulative construction effect of the Scheme on the receptor is considered to be adverse. The effects of disruption to access to the retained residential properties from traffic management will be temporary and end once construction is finished; the landscape impacts will lessen over time; the geographical extent of the effect relates to a very small part of the study area, at the affected property and its environs; the type of effect is in-combination (different effects combining to generate an amenity effect and disruption effect); the visual effects will lessen over time; the noise effects will alter in magnitude and characteristics during the construction works; the affected receptor is residential, which is a land use type that is more sensitive to change. The essential mitigation noted for the population and human health effects includes mechanisms to relocate the residents of Sheldon Cottages in response to continued engagement with them, aiming to lessen adverse effects of reduced amenity and disruption. Essential mitigation also requires continued protection and maintenance of the gardens of Sheldon Cottages during the construction phase and this is taken into account in the cumulative effects assessment. The intra-Scheme cumulative effect on this receptor is assessed as minor adverse and not significant. No additional essential mitigation for cumulative effects is proposed. The residual CEA is minor adverse and not significant.							
Withybridge Lane / Withybridge Mill / Butlers Court	N/A – single project effect not applicable to this topic	Construction activities may impact the setting of heritage assets (buildings off Withybridge Mill) through disruptions that limit or prevent the significance (value) of the asset being expressed. The predicted **residual effect is slight adverse, which is not significant.**	N/A – single project effect not applicable to this topic.	During construction receptors at Withybridge Lane and Butlers Court will experience a **moderate adverse residual effect which is not significant** mainly due to the loss of screening vegetation, proximity to works and consequent intrusion to views.	N/A – single project effect not applicable to this topic.	Construction activities resulting in noise and air quality impacts will temporarily affect amenity and health for residents of properties at Withybridge Lane. Residents will also experience demolition resulting in the loss of part of their nearest community. **Negative health outcomes** are predicted, with the factors contributing to the change in the established characteristics of the area assessed as **very large adverse and significant** in relation to human health.	N/A – single project effect not applicable to this topic.	No additional mitigation has been identified above the measures as outlined in the relevant topic chapters (Chapter 9 – Landscape and Visual (~~application~~Application document TR010063/~~–~~APP/6.7); Chapter 11 – Cultural Heritage (~~application~~Application document TR010063/~~-~~APP/6.9) and Chapter 13 – Population and Human Health (~~application~~Application document TR010063/~~–~~APP/~~-~~6.11)) and within the Environmental Management Plan (1st iteration) (~~application~~Application document TR010063/~~–~~APP/~~-~~7.3) and the REAC (~~application~~Application document TR010063/~~–~~APP/~~-~~7.4).
	Significance of cumulative effects							
	The receptor comprises a combination of heritage assets and residential properties. The combined effects relate to impacts on the setting of heritage assets, loss of vegetation and increased perception of construction noise and activities – vegetation will be lost and construction/demolition will be experienced as intrusive both visually and in terms of noise by residents. The noise impacts and landscape impacts of construction activities will endure for up to 24 months and will be temporary. The vegetation clearance will start to be replaced with planting during construction, so will be permanent/evolving. The cumulative construction effect of the Scheme on the receptor is considered to be adverse. The landscape impacts will lessen over time; the geographical extent of the effect relates to a small part of the study area, at the affected roads; the type of effect is in-combination (different effects combining to generate an amenity effect and disruption effect); the visual effects will lessen over time; the noise effects will alter in magnitude and characteristics during the construction works; the affected receptor is residential, which is a land use type that is more sensitive to change. The essential mitigation noted for the population and human health effects includes prescriptive expectations relating to the role of a PLO and development and implementation of a CEP to provide information, support and a route for consultation activities to be altered in response to any issues arising, which aim to lessen adverse effects of reduced amenity and disruption and this is taken into account in the cumulative effects assessment.							

Receptor	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Population and Human Health	Road Drainage and the Water Environment	Mitigation
	The intra-Scheme cumulative effect on this receptor is assessed as minor adverse and not significant. No additional essential mitigation for cumulative effects is proposed. The residual CEA is minor adverse and not significant.							
M5J10 Southern Quadrant (includes Withybridge Gardens and the location of the Flood Storage Area)	The construction of the Flood Storage Area as part of the Scheme will result in the permanent loss of a bat roost and two main badger setts. The construction of the Scheme overall will result in a **minor adverse residual effect** on bats, which is not significant. The delivery of the Flood Storage Area provides mitigation for Scheme impacts and will support biodiversity net gain.	N/A – single project effect not applicable to this topic	The construction of the Flood Storage Area will be one or two ALC grades poorer than the ALC grades assigned to the land prior to construction and no longer of BMV. This impact is anticipated to have a **moderate adverse residual effect.**	N/A – single project effect not applicable to this topic	N/A – single project effect not applicable to this topic	The Scheme will result in permanent land take and total loss of properties at Withybridge Gardens. This will result in a **large adverse and significant residual effect.** The prospect of the Scheme triggering a need to move home and the knowledge of subsequent demolition of that home is noted as a source of anxiety and stress, the impact of which will vary according to the individual and their circumstances. This, combined with the landscape changes for the remaining residents of the cluster. has been noted as resulting in **negative health outcomes,** which have been assessed as **very large adverse and significant** in relation to human health.	N/A – single project effect not applicable to this topic – the Flood Storage Area is part of the embedded mitigation for effects predicted on the water environment.	No additional mitigation has been identified above the measures as outlined in the relevant topic chapters (Chapter 7 - Biodiversity (~~application~~Application document TR010063/-APP/-6.5); Chapter 10 – Geology and Soils (~~application~~Application document TR010063/-APP/-6.8) and Chapter 13 – Population and Human Health (~~application~~Application document TR010063/-APP/-6.11)) and within the Environmental Management Plan (1st iteration) (~~application~~Application document TR010063/-APP/-7.3) and the REAC (~~application~~Application document TR010063/-APP/-7.4). Properties subject to demolition will require compensation, which falls outside the scope of the ES.
	Significance of cumulative effects							
	The receptor comprises a combination of agricultural land, terrestrial habitats supporting protected species and residential properties. The combined effects relate to impacts from loss of habitat for protected species, degradation of the quality of agricultural land (through conversion to alternative purposes) and property demolition – no residents will remain at this receptor location, but the health assessment notes the negative health outcomes for residents associated with the process of vacating the affected homes. As the construction phase progresses, the receptor will evolve into a landscaped Flood Storage Area, as per the environmental design for the Scheme. The agricultural land impacts will be permanent and irreversible; the habitat impacts will be permanent insofar as some habitats will be lost, but the biodiversity of the location will evolve with the introduction of replacement habitats. No permanent residents will remain. The cumulative construction effect of the Scheme on the receptors is considered to be adverse. The embedded mitigation for communication and engagement with affected homeowners will seek to lessen the adverse health impacts and compensation (outside the scope of the EIA) is required for the loss of private residences. The magnitude of the habitat impacts in the wider biodiversity context will lessen over time, with the environmental design proposing increased biodiversity in this location that will start to be delivered during construction; the geographical extent of the effect relates to a small part of the study area; the type of effect is in-combination (different effects combining to generate changes to habitat); the affected receptors (at the conclusion of construction) are agricultural land and protected species, which are land use types that are more sensitive to change but can be resilient and adapt. The embedded mitigation noted for this location involves the establishment of a flood storage area that incorporates biodiversity enhancements that will start to be realised in the latter stages of construction and remain once operational. All embedded mitigation is taken into account in the cumulative effects assessment. The intra-Scheme cumulative effect on receptors at this location is assessed as minor adverse and not significant. No additional essential mitigation for cumulative effects is proposed. The residual CEA is minor adverse and not significant.							

Table 15-5 – Intra-Scheme cumulative effects between topics on receptor groups – Operation

Receptor	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Population and Human Health	Road Drainage and Water Environment	Mitigation
Leigh Brook	The operation of the Scheme has the potential to result in permanent changes in water quality, resulting in a **minor adverse residual effect.**	N/A – single project effect not applicable to this topic.	N/A – single project effect not applicable to this topic.	N/A – single project effect not applicable to this topic.	N/A – single project effect not applicable to this topic.	N/A – single project effect not applicable to this topic.	The Scheme's flood storage area will increase flow volumes in Drain 22 and decrease flood flows in the Leigh Brook between the M5 and Coombe Hill, resulting in a **minor adverse residual effect.**	No additional mitigation has been identified above the measures as outlined in the relevant topic chapters (Chapter 7 – Biodiversity (~~application~~Application document TR010063/—APP/6.5) and Chapter 8 – Road Drainage and the Water Environment (~~application~~Application document TR010063/—APP/6.6)) and within the Environmental Management Plan (1st iteration) (~~application~~Application document TR010063/—APP/7.3).
	Significance of cumulative effects							
	The receptor comprises the Leigh Brook watercourse. The combined effects relate to impacts arising from the Scheme resulting in changes to water flow rates and water quality, potentially leading to effects for biodiversity and the incidence and management of flood waters. As the operational phase progresses, the receptor will experience evolution in response to these changes. Embedded mitigation relating to the control of water quality is taken into consideration in the cumulative assessment. The two minor residual adverse effects anticipated are not considered to equate to any greater or different cumulative effect. The cumulative operational effect of the Scheme on the receptor is considered to be adverse. The embedded mitigation for the water environment includes control measures that are assessed as effective in maintaining water quality within acceptable conditions and, in turn, this mitigation should lessen the risk of consequential adverse effects for biodiversity. The magnitude of impacts will lessen over time as the Leigh Brook and the flora and fauna that it supports adapts; the geographical extent of the impact relates to a relatively short stretch of the Leigh Brook and therefore represents a small part of the study area; the type of effect is in-combination (different effects combining to generate changes to habitat); the affected receptors are the flora and fauna associated with this stretch of Leigh Brook, and are considered to be capable of adaptation and resilience to change. All environmental design for the Scheme and embedded and essential mitigation from topics in relation to this receptor are taken into account in the cumulative effects assessment. The intra-Scheme cumulative effect on this receptor is assessed as minor adverse and not significant. No additional essential mitigation for cumulative effects is proposed. The residual CEA is minor adverse and not significant.							
North Uckington (Uckington to the north of the A4019)	N/A – single project effect not applicable to this topic.	N/A – single project effect not applicable to this topic.	N/A – single project effect not applicable to this topic.	During operation properties along The Green are expected to experience a moderate adverse residual effect, which is not significant in Year 1 and a slight adverse residual effect in year 15 of operation once Scheme mitigation planting has established.	N/A – single project effect not applicable to this topic.	For this topic, the future baseline (Year 15 of operation) also considers the presence of development proposed within the JCS and a proposed development of 16 units at Uckington Farm. The Scheme will deliver transport infrastructure, which JCS policy states is necessary for the full quantum of JCS development to proceed. In opening year, the key characteristics of the settlement of Uckington are anticipated to transition to a more urban character. By Year 15 of operation, it is expected that the settlement will evolve into a much busier and urban satellite location, encircled to the north by a substantially greater proportion of medium density housing as opposed to agricultural fields and with an increase in through movements within the village by a range of modes.	The Scheme will alleviate flood risk in north Uckington resulting in a neutral to **slight beneficial residual effect.**	Embedded and topic specific essential mitigation has been identified as outlined in the relevant topic chapters (Chapter 8 – Road Drainage and the Water Environment (~~application~~Application document TR010063/—APP/6.6); Chapter 9 – Landscape and Visual (~~application~~Application document TR010063/—APP/6.7) and Chapter 13 – Population and Human Health (~~application~~Application document TR010063/—APP/6.10)) and within the Environmental Management Plan (1st iteration) (~~application~~Application

Receptor	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Population and Human Health	Road Drainage and Water Environment	Mitigation
						The population assessment predicts **large beneficial and significant residual effects** on access for the residents of this cluster. In contrast, the changes to the key characteristics of the settlement are assessed as **moderate adverse and significant residual effects**. Both **positive and negative health outcomes** are predicted for existing residents of Uckington (within a cluster that also includes residents of Moat Lane and Cooks Lane). The Scheme will have the effect of alleviating congestion and improving accessibility to community, recreational, educational and healthcare services, resulting in a **positive health outcome.** Access improvements are assessed as **large beneficial residual effects in OY** and **very large beneficial residual effects in FY**. The changes to the landscape are assessed as negative health outcomes, representing slight adverse (not significant) residual effects in OY, rising to moderate adverse and significant residual effects by FY.		document TR010063/—APP/7.3). Additional essential mitigation for cumulative effects has been identified – references CEA2 and CEA3 within the REAC (~~application~~Application document TR010063/—APP/7.4).
	Significance of cumulative effects							
	The receptor comprises residents of the settlement of Uckington, including prospective residents of the development proposed at Uckington Farm (for the purposes of the Population and Human Health assessment elements). The combined effects relate to impacts from changes to landscape and streetscape character from the introduction of urbanising elements in the A4019 corridor. The CEA for Population and Human Health also takes account of the role of the Scheme as one aspect of enabling the JCS development, which comprises the North West Cheltenham Development Area and safeguarded land to the north-west of Cheltenham, such that new residential and business development would be assumed to be present in the operational future baseline (2042). This additional growth would contribute substantial change in the character and setting of Uckington. As the operational phase progresses, the receptor (residents of north Uckington) will experience transformational change to their village – this is expected to equate to a combination of beneficial effects and health outcomes from improved flood resilience and access to higher quality and more proximate facilities and services based on the realisation of JCS growth planned here (considered in more detail in the inter-project effects assessment in relation to the RFFP proposals), that must be considered in the context of adverse effects on key characteristics of the settlement, manifesting as both transformational landscape effects and negative health outcomes (and significant adverse residual effects on human health). The cumulative operational effect of the Scheme on the receptor, considered in the context of delivering enabling transportation infrastructure, is assessed to be a mixture of beneficial and adverse. Beneficial effects derive from the drainage design, which will reduce flood risk in north Uckington. The environmental design for the Scheme together with embedded mitigation that will secure the ongoing management of planting is assessed as effective in lessening the adverse landscape impacts over time as it matures. The embedded mitigation for interaction with communities, including Uckington, once the Scheme is operational includes proposals designed to support residents in adapting to and benefitting from the changes that the Scheme will bring, including in preparation for the JCS development identified close to the village. The geographical extent of the impact relates to existing residents within north Uckington and therefore represents a small part of the study area. The type of effect is in-combination (different effects combining to generate amenity impacts); the perceived magnitude of the effects from the Scheme are expected to lessen over time, albeit that this may alter on an individual basis, as will the resilience of individuals to adapt to change – this may contribute to more enduring health impacts for some. All environmental design for the Scheme and embedded and essential mitigation from topics in relation to this receptor are taken into account in the cumulative effects assessment. The intra-Scheme cumulative effect on this receptor is assessed as minor to moderate adverse and significant. Additional essential mitigation has been identified in relation to managing the longer term transformation of the character, use and setting of Uckington, in the context of the Scheme as an enabler to future development at North West Cheltenham Development Area and safeguarded land to the north-west of Cheltenham, noting the CEA assumptions that Scheme construction may overlap with the strategic development sites enabling works. This is complex insofar as it crosses over with the inter-project CEA, relating to RFFPs that are at least partially dependent upon the Scheme to progress (rather than being entirely independent from the Scheme). REAC (~~application~~Application document TR010063/—APP/-7.4) reference CEA3 includes a commitment by GCC to establishing the right level of discussion, meeting, planning and coordination of programmes and engagement with the public and other stakeholders between GCC officer, the Scheme Principal Contractor (PC) and relevant developers of the sites identified in the JCS for development of safeguarding, with the aim of ensuring that proposals for change at these locations complement the intentions of the Scheme (CEA2 also refers) and that all developers co-ordinate to engage meaningfully with local communities and stakeholders to support people in adapting to transformational change. In the context of the intra-Scheme cumulative effects, this essential cumulative mitigation measure is considered a means of ensuring that the community of Uckington							

Receptor	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Population and Human Health	Road Drainage and Water Environment	Mitigation
	can be informed, supported and influential in shaping how construction activities from all strategic developments are managed, allowing a route for pro-active prevention and reactive response to issues emerging, particularly around noise, disturbance and community anxiety. This is taken into account in the cumulative effects assessment. The residual CEA is minor adverse and not significant.							
M5J10 Northern Quadrant includes Stanboro Lane	During the operation of the Scheme, the Stanboro Lane Orchard habitat complex will degrade as a result of small-scale localised increases in NOx levels and reduced air quality resulting in a **minor adverse residual effect.**	N/A – single project effect not applicable to this topic.	N/A – single project effect not applicable to this topic.	This receptor includes a number of Visual Receptors (VR) – VR15a and 15b relate to Stanboro, Stanboro Lodge, Stanboro Cottage and Grasmere – during operation, there will be a **slight adverse (not significant) residual effect** in OY, reducing to a **neutral effect** in FY. For Sheldon Cottages (VR3a),during operation there will be a **large adverse residual effect which is significant** in OY, reducing to a **moderate adverse residual effect** in FY, which is not significant.	During operation, there will be a decrease in day and night time noise experienced at retained properties within this cluster. Sheldon Cottages, which are within this cluster, are assessed as experiencing **minor beneficial residual effects, which are not significant**.	During operation, there will be increased ease of movement due to reduced congestion and queuing resulting in a **moderate beneficial and significant residual effect** in the population assessment**.** The access improvements are noted as contributing to positive health outcomes, assessed as large beneficial and significant in OY and rising to very large beneficial and significant in FY. The changes to the landscape setting and overall amenity for this receptor cluster have been associated with a **negative health outcome.** The assessment records a **slight adverse (not significant) residual effect** at OY, worsening to a **moderate adverse and significant residual effect** in FY**.**	N/A – single project effect not applicable to this topic.	No additional mitigation has been identified above the measures as outlined in the relevant topic chapters (Chapter 7 – Biodiversity (~~application~~Application document TR010063/—APP/6.5) and Chapter 13 – Population and Human Health (~~application~~Application document TR010063/—APP/6.11)) and within the Environmental Management Plan (1st iteration) (~~application~~Application document TR010063/—APP/~~P~~7.3).
	Significance of cumulative effects							
	The receptor comprises the existing habitats and residents present to the immediate north-west of M5 Junction 10. The combined effects relate to impacts from changes to the localised road network at Stanboro Lane as well as broader Scheme impacts on traffic flows, and therefore the incidence and dispersion of traffic derived pollutants and the experience of noise. The landscaping proposals within the environmental design will mature once the Scheme is operational, increasingly providing a more naturalised appearance to the changes to the road network and supporting biodiversity. The remaining residential receptors are expected to benefit from the accessibility improvements underlying the Scheme objectives and slight reductions in noise that will continue as the landscaping matures. The cumulative effect of the Scheme on the receptor at Opening Year is considered to be adverse. The landscaping will be immature at this stage and the changes to the localised road network and recovery of land to the north-west used as part of the construction compound areas will take time to re-vegetate and soften into the wider setting, meaning that there will be considerable changes to the existing setting of the retained cottages. The noise climate will be different due to the changes in the position of the junction and the arrangement of access roads and this may take time for residents to acclimatise to, albeit that the noise assessment predicts that overall the noise levels will be lower once the Scheme is operational and will be further screened as vegetation matures. By year 15 of operation these initial adverse effects are anticipated to have lessened in magnitude; the geographical extent of the effect relates to a very small part of the study area, at the affected properties and their immediate environs; the type of effect is in-combination (different effects combining to generate an amenity effect); the visual effects will lessen over time; the affected receptor is residential, which is a land use type that is more sensitive to change. The essential mitigation noted for population and human health effects includes mechanisms to relocate the residents of Sheldon Cottages in response to continued engagement with them, aiming to lessen adverse effects of reduced amenity and disruption, which offers a means of ensuring that they can be supported in alternative accommodation until they are content to return. Essential mitigation also requires continued protection and maintenance of the gardens of Sheldon Cottages during the construction phase and, as retained vegetation, any damage that manifests within the early stages of operation would also be rectified as part of the Scheme. These essential mitigations are taken into account in the cumulative effects assessment. The intra-Scheme cumulative effect on this receptor is assessed as minor adverse and not significant. No additional essential mitigation for cumulative effects is proposed. The residual CEA is minor adverse and not significant.							
Withybridge Lane / Withybridge Mill / Butlers Court	N/A – single project effect not applicable to this topic	N/A – single project effect not applicable to this topic	N/A – single project effect not applicable to this topic	During operation, the visual amenity for properties at Withybridge (VR8) will be partially affected by the new link road given	Upon the opening of the Scheme, residential receptors located on Withybridge Lane are expected to	During operation, there will be reduced noise on Withybridge Lane resulting from the link road providing an alternative option for vehicle travellers accessing the B4634 from the A4019 and vice-versa. In terms of overall amenity, this may be	N/A – single project effect not applicable to this topic	No additional mitigation has been identified above the measures as outlined in the relevant topic chapters (Chapter 6 – Noise and Vibration

Receptor	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Population and Human Health	Road Drainage and Water Environment	Mitigation
				its proximity and elevated position. There will be a **moderate adverse residual effect,** which is not significant in Year 1 **reducing to a slight adverse effect in 15 years of operation.** During operation, the Butlers Court Complex (VR6) is anticipated to experience a **moderate adverse residual effect which is not significant in Year 1** due to proximity, lack of replacement screening features and new impact of lighting features, evolving to **a slight beneficial effect in 15 years of operation**.	experience **major beneficial residual effects.** In the long-term, the residential receptors on Withybridge lane will experience **moderate beneficial residual effects**	offset by adverse landscape effects and a general increase in vehicular movements and change to the rural characteristics in this part of the study area, contributing to **slight adverse residual effects,** which are not significant. A **positive health outcome** is noted in relation to the reduction in traffic from retained properties fronting Withybridge Lane and the attendant reduction in noise, as well as enhanced accessibility – this represents a **large beneficial and significant residual effect** in OY and a **very large and significant beneficial residual effect** in FY . The landscape changes are noted as contributing to negative health outcomes, assessed as **slight adverse (not significant)** in OY and **moderate adverse and significant** in FY.		(~~application~~Application document TR010063/—APP/6.4); Chapter 9 – Landscape and Visual (~~application~~Application document TR010063/—APP/6.7) and Chapter 13 – Population and Human Health (~~application~~Application document TR010063/—APP/6.11)) and within the Environmental Management Plan (1st iteration) (~~application~~Application document TR010063/—APP/7.3).
	Significance of cumulative effects							
	The receptor comprises the remaining residents at Withybridge Lane, Withybridge Mill and Butlers Court. The combined effects relate to impacts from changes to traffic flows, altering the incidence and experience of noise as well as changes in the landscape derived from the Link Road and A4019 becoming more dominant/new landscape features, plus maturing new planting. The remaining residential receptors are expected to benefit from the accessibility improvements underlying the Scheme objectives, as well potentially experiencing health benefits from reduced noise impacts. The landscape effects are anticipated to evolve from minor adverse, which could be experienced as an amenity effect on residents, to slightly beneficial as the operational phase progresses and planting matures. Health outcomes are assessed as evolving from negative at opening year, due to amenity impacts and the need to adapt to change, but progressing to positive by year 15 as landscaping matures and the benefits of the noise reductions are realised. However, the wider landscape changes that are anticipated to be catalysed by the transport improvements from the Scheme contribute to a negative health outcome, and significant adverse effect on human health in FY. The cumulative operational effect on the residential receptors is considered to be adverse. The cumulative operational effect of the Scheme on the receptor at Opening Year is considered to be adverse. The landscaping will be immature at this stage and the introduction of the Link Road into the local landscape will take time to re-vegetate and soften into the amended landscape setting. The noise climate will be different due to the changes in the position of noise sources relative to the residential properties and this may take time for residents to acclimatise to, albeit that the noise levels will be lower once the Scheme is operational and will be further screened as vegetation matures. By year 15 of operation these initial adverse effects are anticipated to have lessened in magnitude; the geographical extent of the effect relates to a small part of the study area, at the affected properties and their immediate environs; the type of effect is in-combination (different effects combining to generate an amenity effect); the visual effects will lessen over time; the affected receptor is residential, which is a land use type that is more sensitive to change. The essential mitigation noted for population and human health effects includes mechanisms to engage with residents to discuss and respond to concerns and for support to be progressed into the operational stage in terms of enabling people to adapt to the changes and realise the accessibility improvements, aiming to lessen adverse effects of reduced amenity and disruption, These essential mitigations are taken into account in the cumulative effects assessment. The intra-Scheme cumulative effect on this receptor is assessed as minor adverse and not significant. No additional essential mitigation for cumulative effects is proposed. The residual CEA is minor adverse and not significant.							
M5J10 Eastern Quadrant (Includes informal Traveller Site and Withybridge underpass)	N/A – single project effect not applicable to this topic. The Withybridge (A4019) underpass provides a traffic free route for bats across the A4019 road alignment and the safe movement of other	N/A – single project effect not applicable to this topic	N/A – single project effect not applicable to this topic	N/A – single project effect not applicable to this topic	During operation, the residents of the informal Traveller Site are predicted to experience a **minor beneficial noise residual effect** over the long-term due to	The Scheme includes the Withybridge (A4019) underpass which will enable traffic free access for pedestrians, cyclists and equestrians across the A4019 route alignment connecting to a new continuous shared use path along the A4019 corridor, as well as new recreational routes to the south of the A4019. **Positive health outcomes** are anticipated for users of the	N/A – single project effect not applicable to this topic	No additional mitigation has been identified above the measures as outlined in the relevant topic chapters (Chapter 7 – Biodiversity (~~application~~Application document TR010063/—APP/6.5) and Chapter 13 – Population and Human Health

Receptor	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Population and Human Health	Road Drainage and Water Environment	Mitigation
	mammal species, reptiles and amphibians – this is part of the mitigation for bats at a regional scale.				the new Scheme alignment.	PRoW and WCH network, assessed as **large beneficial and significant residual effects** in terms of accessibility (OY) and safety (OY and FY), rising to **very large beneficial and significant residual effects** for access in FY. Residents of the informal Ttraveller site are assessed as experiencing **moderate beneficial and significant residual access effects** in relation to the operational population assessment.		(applicationApplication document TR010063/—APP/6.11)) and within the Environmental Management Plan (1st iteration) (applicationApplication document TR010063/—APP/7.3).
	Significance of cumulative effects							
	The receptor comprises the protected species using existing habitats in this location, residents of the informal Traveller Site to the immediate north-east of M5 J10 and wider groups that pass through this area by various modes for recreational purposes. The combined effects relate to impacts from changes to traffic flows (principally experienced as reductions in noise) and the presence of the Withybridge underpass aspect of the Scheme, which incorporates a traffic free means for bats, walkers, cyclists and horse-riders to pass beneath the A4019. The overall effects are considered to be beneficial; however, the receptor types are varied and in essence each benefit relates to a different receptor. On this basis, there is no single receptor that will experience intra-Scheme cumulative effects, but rather it is a cluster of different receptors that will each experience different benefits from aspects of the Scheme design. The cumulative effect of the Scheme on the receptor cluster (as a general location used by many receptor types) is considered to be minor beneficial and not significant. No additional essential mitigation for cumulative effects is proposed. The residual CEA is minor beneficial and not significant.							
Barn Farm East	N/A – single project effect not applicable to this topic	N/A – single project effect not applicable to this topic	N/A – single project effect not applicable to this topic	During the operation of the Scheme, there will be a **slight adverse residual effect in Year 1** and a **slight beneficial residual effect in 15 years** of operation on visual amenity for residents at Barn Farm East.	During operation, Barn Farm residents are predicted to experience a **minor beneficial noise residual effect** over the long-term due to the new Scheme alignment.	N/A – single project effect not applicable to this topic	During operation, the Flood Storage Area will lower the flood risk at Barn Farm East resulting in a **major beneficial significant effect.**	No additional mitigation has been identified above the measures as outlined in the relevant topic chapters (Chapter 8 – Water Environment (applicationApplication document TR010063/—APP/6.6); Chapter 9 – Landscape and Visual (applicationApplication document TR010063/—APP/6.7) and Chapter 6 – Noise and Vibration (applicationApplication document TR010063/—APP/6.4)) and within the Environmental Management Plan (1st iteration) (applicationApplication document TR010063/—APP/7.3).
	Significance of cumulative effects							
	The receptor comprises the residents of properties in the vicinity of Barn Farm East. The combined effects relate to impacts from changes to the landscape and water environment due to the design of the Scheme, potentially leading to effects for landscape character, noise levels and the incidence and management of flood waters, all of which contribute to the experience of residential amenity. As the operational phase progresses, the landscaping will mature and soften the features into the setting and the residential receptors are anticipated to adapt and acclimatise to the changes; and beneficial effects (enhanced landscaping, reduced noise and reduced flood risk) are anticipated that could manifest as improved amenity and positive health outcomes. The cumulative effects identified start to manifest as beneficial for amenity and human health in Opening Year (particularly the reduction in flood risk to property) and are predicted to deliver greater benefits as the Scheme settles into the landscape up to Year 15 of operation and beyond and greater noise attenuation is achieved through landscaping. The geographical extent of the effects relates to a small number of residential properties and thus a very small part of the study area. The effects are in-combination (different impacts combining to generate an amenity effect) and will increase in efficacy over time. The receptors are residential, which is a receptor type that is more sensitive to change. It is the Scheme design and embedded mitigation that will ensure the continued management of the flood storage and landscaping assets that contribute to the beneficial effects.							

Receptor	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Population and Human Health	Road Drainage and Water Environment	Mitigation
	The cumulative effect of the Scheme on the residential receptors is considered to be minor beneficial and not significant. No additional essential mitigation for cumulative effects is proposed. The residual CEA is minor beneficial and not significant.							
M5J10 Southern Quadrant (includes Withybridge Gardens and the location of the Flood Storage Area)	The Flood Storage Area will support wetland habitats, scrub, woodland and species rich grassland to enable the Scheme to achieve a net gain in biodiversity. There is no single project effect attributed to the FSA creation in isolation.	N/A – single project effect not applicable to this topic	N/A – single project effect not applicable to this topic	N/A – single project effect not applicable to this topic. The Flood Storage Area design has been developed to deliver the landscape design principles of the Scheme overall and offer elements of mitigation to proximate residents.	N/A – single project effect not applicable to this topic	No residents will remain at Withybridge Gardens in the operational phase. The design of this part of the Scheme incorporates a new bridleway access to the wider recreational network north and south of the A4019, which itself will be enhanced by the Scheme. **Positive health outcomes** are anticipated for users of the PRoW and WCH network, assessed as **large beneficial and significant residual effects** in terms of accessibility (OY) and safety (OY and FY), rising to **very large beneficial and significant residual effects** for access in FY.	N/A – single project effect not applicable to this topic. The Flood Storage Area has been designed as an holistic strategy to deliver flood mitigation for a number of potential impacts of the Scheme, as an element of embedded mitigation.	No additional mitigation has been identified above the measures as outlined in the relevant topic chapters (Chapter 7 - Biodiversity (~~application~~Application document TR010063/~~—~~APP/6.5), Chapter 8 – Road Drainage and the Water Environment (~~application~~Application document TR010063/~~—~~APP/6.6), Chapter 9 – Landscape and Visual (~~application~~Application document TR010063/~~—~~APP/6.7) and Chapter 13 – Population and Human Health (~~application~~Application document TR010063/~~—~~APP/6.11)) and within the Environmental Management Plan (1st iteration) (~~application~~Application document TR010063/~~—~~APP/7.3).
	Significance of cumulative effects							
	The cumulative effect here is related to an element of the Scheme – the Flood Storage Area – as opposed to a single receptor group. The Flood Storage Area has been developed as an holistic design response to potential impacts across a range of topics – it is anticipated to deliver multiple benefits in terms of biodiversity net gain, landscape diversity, management of flood waters and the creation of a bridleway, well connected to existing and proposed enhancements to the recreational WCH network in the vicinity. The overall effects are considered to be beneficial across a range of receptor types. On this basis, there is no single receptor that will experience intra-Scheme cumulative effects, but rather it is a cluster of different receptors that will each experience different benefits from aspects of the Scheme design. The cumulative effects identified start to manifest as beneficial for flood risk, biodiversity and WCH access in Opening Year (particularly the reduction in flood risk) and are predicted to deliver greater benefits as the Scheme settles into the landscape up to Year 15 of operation and beyond and habitats mature to support greater biodiversity. The geographical extent of the effects extends to the catchment that the flood storage area serves, the connected ecosystems in this part of the study area and interaction with the wider WCH network. The effects are partly in-combination (different impacts combining to generate a biodiversity and amenity effect) and will increase in efficacy over time. The receptors vary and include protected species and WCH users, who are sensitive to change but also capable of adaptation. It is the Scheme design and embedded mitigation that will ensure the continued management of the flood storage, landscaping and biodiversity assets that contribute to the beneficial effects. The future maintenance of the bridleway is secured as part of the broader implementation and maintenance commitment expressed in measure G1 of the EMP (3rd iteration). The cumulative effect of the Scheme on the receptor cluster (as a general location used by many receptor types) is considered to be moderate beneficial and significant. No additional essential mitigation for cumulative effects is proposed. The residual CEA is moderate beneficial and significant.							
Residential properties south of the A4019 east of the West Cheltenham Fire Station and on	N/A – single project effect not applicable to this topic	N/A – single project effect not applicable to this topic	N/A – single project effect not applicable to this topic	During Year 1 of operation there will be a **slight adverse residual effect** on properties on Homecroft Drive (R23) and properties on south of the A4019 (R24).	Residential properties in this cluster form part of larger groups of residents assessed as variously experiencing **moderate and major beneficial**	During operation residents of properties at Homecroft Drive and Appleyard Close can expect reduced congestion and queuing times to access the strategic road network contributing to a **positive human health outcome.** This accessibility improvement is assessed as resulting in a **large beneficial residual effect** on human health, which is significant in both OY and	N/A – single project effect not applicable to this topic	No additional mitigation has been identified above the measures as outlined in the relevant topic chapters (Chapter 9 – Landscape and Visual (~~application~~Application document TR010063/~~—~~APP/6.7) and Chapter 13 – Population and Human Health

Receptor	Biodiversity	Cultural Heritage	Geology and Soils	Landscape and Visual	Noise and Vibration	Population and Human Health	Road Drainage and Water Environment	Mitigation
Homecroft Drive				After 15 years of operation there will be a **neutral residual effect** on properties on Homecroft Drive and a **slight beneficial residual effect** on visual amenity for properties south of the A4019.	**residual effects**, which are significant. This is attributed to changes from the Scheme including new alignment of the road and proposed noise barriers as well as changes in traffic distribution.	FY. The population assessment also assesses improvements to access as a **large beneficial and significant residual effect**.		(~~application~~Application document TR010063/~~—~~APP/6.11)) ~~-~~and within the Environmental Management Plan (1st iteration) (~~application~~Application document TR010063/~~—~~APP/7.3).
	Significance of cumulative effects							
	The receptor comprises residents of properties to the south of the A4019 east of the West Cheltenham Fire Station and residents of properties on Homecroft Drive. The combined effects relate to impacts from changes to landscape and streetscape character from the introduction of urbanising elements in the A4019 corridor within a landscaped design, as well as specific elements of the Scheme design, which include alterations to private property access that will use service roads parallel to the A4019 to direct residents to signal controlled junctions that offer multi-directional access/egress (replacing direct driveway/road access onto the A4019). These two types of impacts (landscape and access) both contribute to human health effects and have been addressed within the relevant topic assessment. The noise assessment also notes beneficial effects in relation to reductions in noise levels experienced at properties within the receptor cluster. The cumulative effect of the Scheme on the receptor is considered to be minor beneficial. No additional essential mitigation for cumulative effects is proposed. The residual CEA is minor beneficial and not significant							

15.8. Summary of intra-Scheme cross-topic cumulative effects

15.8.1. The CEA of intra-Scheme cumulative effects has identified a number of cross-topic intra-Scheme effects, taking account of the Scheme, embedded mitigation and the essential mitigation identified in the relevant technical assessments. The effects that have been identified as minor or greater are summarised in this section.

Construction Effects

15.8.2. Minor adverse intra-Scheme cumulative construction effects on the following receptor clusters, which are not significant:

- Owner and customers of the House in the Tree Public House.
- Owner and customers of the Gloucester Old Spot Public House.
- Residents of Stanboro Cottage.
- Residents of M5 Junction 10 Northern Quadrant, including Sheldon Cottages.
- Residents of Withybridge Lane, Withybridge Mill and Butlers Court.
- Receptors in the M5 Junction 10 Southern Quadrant (terrestrial habitats, agricultural land and residential receptors).

15.8.3. Moderate adverse intra-Scheme cumulative construction effects, which are significant, have been identified on the following receptors for the portion of the construction phase when the M5 J10 slip road closures and diversion routes are in place:

- Residents in north and south Uckington, including Buildings at Moat House and other properties on Moat Lane.
- Families with children and adolescents residing along roads experiencing temporary increases in through traffic.

15.8.4. Essential mitigation for the adverse cumulative effects on residents at north and south Uckington has been identified. This is set out as G4 and G10 within the REAC (~~application~~Application document TR010063/~~—~~APP/-7.4).

15.8.5. Essential mitigation for the adverse cumulative effects on families with children and adolescents residing along roads experiencing temporary increases in through traffic has been identified. This is set out as G10 and PHH9 within the REAC (~~application~~Application document TR010063/~~—~~APP/-7.4).

Construction residual effects

15.8.6. The residual effects assessment of intra-Scheme cumulative construction effects is unchanged from the main assessment. Two significant residual intra-Scheme cumulative construction effects have been identified on a precautionary basis, but relate only to the period of the construction phase when the M5 J10 slip road closures and diversions are in place. The significance of the residual effects will vary depending on the capacity of individuals to adapt to change.

Operational effects

15.8.7. Minor adverse intra-Scheme cumulative operational effects have been identified on the following receptors, which are not significant:

- Leigh Brook.
- Remaining residents of M5 Junction 10 Northern Quadrant, including Sheldon Cottages.
- Remaining residents of Withybridge Lane, Withybridge Mill and Butlers Court.

15.8.8. Moderate adverse intra-Scheme cumulative operational effects have been identified on the following receptors, which are significant:

- Residents of north Uckington.

15.8.9. Minor beneficial intra-Scheme cumulative operational effects have been identified on the following receptors, which are not significant:

- Receptors in the M5 Junction 10 Eastern Quadrant.
- Residents at Barn Farm East.
- Residents of properties south of the A4019 east of the West Cheltenham Fire Station and on Homecroft Drive.

15.8.10. Moderate beneficial intra-Scheme cumulative operational effects have been identified on the following receptors, which are significant:

- Receptors in the M5 Junction 10 Southern Quadrant (terrestrial habitats, agricultural land and residential receptors).

15.8.11. Essential mitigation for the adverse cumulative effects on residents at north Uckington has been identified. This is set out as CEA2 and CEA3 within the REAC (~~application~~Application document TR010063/~~—~~APP/-7.4).

Operational residual effects

15.8.12. The residual effects assessment of intra-Scheme cumulative operational effects is unchanged from the main assessment for all receptors except residents of north Uckington.

15.8.13. The essential cumulative effects mitigation CEA2 and CEA3 are considered to lessen the magnitude of the adverse effects predicted for residents of north Uckington. The residual intra-Scheme cumulative effects assessment for this receptor in operation is minor adverse, **which is not significant**.

15.8.14. The beneficial effects at the M5 Junction 10 southern quadrant receptors are assessed as residual moderate beneficial intra-Scheme cumulative operational effects, which are significant.

15.9. Summary of intra-Scheme cumulative effects, within topics

15.9.1. This sub-section summarises the significant residual intra-Scheme cumulative effects that have been identified within individual topic assessments. This information draws directly from the source topic chapters, where additional explanation can be found.

Air Quality

15.9.2. For the air quality assessment, the intra-Scheme in-combination aspect of the CEA is scoped out.

Noise and Vibration

15.9.3. For the noise and vibration assessment, intra-Scheme cumulative effects within the topic assessment relate to receptors experiencing impacts on both noise and vibration. The assessment has not identified any significant residual effects associated with these combinations of impacts.

Biodiversity

15.9.4. The biodiversity assessment methodology inherently includes consideration of all the different types of Scheme impacts for each biodiversity resource, and takes them all into account to give a single level of impact for each resource. Therefore, this assessment inherently considers combined effects from different sources (within topic intra-Scheme effects). Cross-topic intra-Scheme cumulative effects on biodiversity resources are also inherently assessed. For example, the impact assessment considers the potential for noise and vibration and air quality impacts to result in effects on biodiversity resources, as well as any impacts to the water environment and any effects in relation to aquatic biodiversity resources.

15.9.5. The main assessment concludes that the Scheme design, embedded and essential mitigation are collectively effective in ensuring that there are no significant residual

adverse effects in relation to biodiversity. It is notable that this includes Scheme-wide approaches to mitigation for bats and the delivery of Biodiversity Net Gain (BNG).

15.9.6. On the basis of the above, there are no additional intra-Scheme cumulative effects from the assessment of biodiversity to report in this section.

Road Drainage and the Water Environment

15.9.7. For the road drainage and water environment assessment, the methodology requires impacts to be reported individually for each receptor on the basis of different categories, with water quality, hydromorphology, groundwater and flood risk each forming separate assessments. As a result of this approach, different receptors may be noted as experiencing impacts from more than one aspect and this has been explored in the intra-Scheme cumulative effects within the topic assessment.

15.9.8. Receptors associated with these combinations of impacts are noted as follows:

- River Chelt – all four aspects.
- Leigh Brook – all four aspects.
- Drain 22 – all aspects except water quality.
- Drain 12 – all aspects except water quality.
- Drain 8 – all aspects except flood risk.
- Drain 15 – all four aspects.

15.9.9. In all instances, the in-combination cumulative intra-Scheme effects within the topic have been assessed as not exceeding the significance thresholds applicable to the topic. The CEA therefore concludes that the in-combination intra-Scheme effects within the topic are unlikely to be significant in relation to the receptors identified.

Landscape

15.9.10. In terms of intra-Scheme effects relating to Landscape and Visual Impacts, the assessment is, by nature, a cumulative effects assessment. The assessment is informed by considering the outcomes and effects of the interaction of multiple impacts on views and landscape character, drawing on information relating to the environmental design and other relevant factors. The landscape and visual impact assessment therefore provides a cumulative assessment of the impacts of the Scheme (both within topic and cross-topic) on the various receptors outlined in the baseline conditions section of the topic chapter as an intrinsic part of the main assessment.

15.9.11. On the basis of the above, there are no additional intra-Scheme cumulative effects from the assessment of landscape and visual effects to report as they are covered in the main assessment.

Geology and soils

15.9.12. For the geology and soils assessment, the main assessment methodology requires impacts to be reported individually on the basis of different categories, separate from other aspects. As a result of this approach, intra-Scheme cumulative effects within the topic assessment relate to receptors experiencing impacts of more than one type. The following receptors therefore have the potential to experience intra-Scheme in-combination cumulative effects, within the topic:

- River Chelt, Leigh Brook and surface water drains – potential receptor to both soil and groundwater contamination.
- Groundwater in Secondary A superficial and bedrock Aquifer – potential receptor to both soil and groundwater contamination.

15.9.13. The combined effect from soil and groundwater contamination to the receptors has been considered within the ground investigation interpretative report provided in Appendix 10.7 (~~application~~Application refence TR10063 – App 6.15). Negligible cumulative effects are anticipated, which are classified as not significant. No additional mitigation is anticipated.

15.9.14. There are anticipated to be intra-Scheme effects between geology and land quality, soils and agriculture, biodiversity, heritage and the water environment in relation to potential receptors that could be impacted by ground contamination during the construction of the Scheme. However, given the embedded and additional mitigation measures proposed in relation to these disciplines as outlined within each chapter, it is not expected that the combined impact of these effects would be greater than those effects predicted for the geology and land quality assessment. Minor adverse residual cumulative intra-Scheme effects are anticipated, which are classified as not significant.

Cultural Heritage

15.9.15. In terms of intra-Scheme effects relating to cultural heritage, the assessment of effects is, by nature, a cumulative effects assessment. The methodology for the assessment of the impacts on cultural heritage inherently includes consideration of all stages of the construction and operation of the Scheme, including any mitigation works for other topics that are embedded within the Scheme and are likely to impact heritage assets. Landscaping and ecological embedded mitigation have therefore been factored into the Scheme design and are assessed with the Scheme impacts and the mitigation outlined for cultural heritage impacts applies to impacts across the Scheme.

15.9.16. On the basis of the above, there are no additional intra-Scheme cumulative effects from the assessment of cultural heritage to report in this section.

Materials and Waste

15.9.17. For the materials and waste assessment, there is only a single source of impact from the Scheme relating to the relevant receptors. On this basis, the intra-Scheme in-combination aspect of the CEA is scoped out.

Population and Human Health

15.9.18. For the population assessment, intra-Scheme cumulative effects within the topic assessment relate to receptors experiencing impacts on access and changes to their key characteristics. Significant residual effects associated with these combinations of impacts are noted as follows:

- **Residents of Uckington** – in construction, changes to key rural characteristics (moderate adverse) and demolition of three residential properties to the south of the A4019 (large adverse).
- **Residents on Stanboro Lane** – in construction, changes to landscape characteristics for residents of Sheldon Cottages (moderate adverse) and the demolition of three properties in the vicinity of Sheldon Nurseries on Stanboro Lane to the north of the A4019 and west of the M5 (large adverse).
- **Residents of Uckington** (retained residential properties) – in operation, impacts on key characteristics of the settlement from demolition of buildings and urbanisation (moderate adverse) and improvements to access for a range of modes for <30 homes at Uckington (moderate beneficial).

15.9.19. In terms of intra-Scheme effects relating to Human Health, the assessment of health outcomes and the associated effects is, by nature, a cumulative effects assessment. The assessment is informed by considering the outcomes and effects of the interaction of multiple impacts on health determinants from the Scheme that affect receptors, drawing on information from air quality, noise, landscape changes and other relevant factors. The future year human health assessment also uses a baseline that incorporates planned future development, thus assuming that new residents and associated facilities and services are operational in addition to the Scheme. The human health assessment therefore provides a cumulative assessment of the impacts of the Scheme (both within topic and cross-topic) on the various determinants of health outlined in the baseline conditions section of the topic chapter as an intrinsic part of the main assessment.

15.9.20. A sensitivity assessment has been undertaken to consider the potential for significant residual cumulative effects from the M5 Junction 10 slip road closures within the Population and Human Health topic. The impact types are not relevant to the Population

assessment. The Human Health assessment is reported in Section 13-26 of Chapter 13 (~~application~~Application document TR010063/~~—~~APP/-6.11), informed by traffic modelling of specific M5 Junction 10 slip road closure scenarios and consequential air quality and noise assessment. The technical results of this sensitivity assessment are provided in the Air Quality and Noise and Vibration chapters of the ES (~~application~~Application documents TR010063/~~—~~APP/-6.3 and TR010063/~~—~~APP/-6.4, respectively).

15.9.21. The sensitivity assessment predicted effects on noise, access/severance, transport network characteristics and landscape amenity due to changes in the amount of vehicles, but particularly the increase in the number of HDVs (Heavy Duty Vehicles) both in absolute terms and as a proportion of through movements. On a precautionary basis, two receptor groups within the affected network of diversion routes and possible deviations were identified as potentially experiencing significant adverse residual effects due to in-combination cumulative effects arising from traffic impacts.

15.9.22. Additional essential mitigation has been identified for the management of cumulative effects from traffic diverted, or seeking to deviate from the signed diversion routes during the period that the M5 J10 slip roads are closed, including measures to discourage HDV through movements on local roads. Taking account of the mitigation proposed (measures G4, G10, PHH4, PHH7 and PHH9 of the REAC (~~application~~Application document TR010063/~~—~~APP/-7.4)), the residual effects of the M5 Junction 10 slip road closures on these communities are considered to include the following significant adverse intra-Scheme cumulative human health effects (on a precautionary basis):

- **Residents of Uckington** – moderate adverse in-combination cumulative effects, principally due to changes in noise and to characteristics of the transport network.
- **Families with children and adolescents (rural and urban context)** – moderate adverse in-combination cumulative effects, principally due to changes in noise and the characteristics of the transport network.

15.9.23. The intra-Scheme cumulative effect on these receptors is assessed as minor adverse and not significant, except during the period of the construction phase when the M5 J10 slip road closures are in place. The residual cumulative effects on these two receptors while the M5 J10 slip road closures and diversions are in place are assessed, on a precautionary basis, as moderate adverse and significant.

15.9.24. On the basis of the inherently cumulative nature of the Human Health assessment and sensitivity assessment outlined above, there are no additional intra-Scheme cumulative effects from the assessment of health outcomes and effects to report as they are covered in the topic assessment reporting. The instances of receptors experiencing multiple impacts from the Scheme resulting in a significant residual effect, using the human health methodology for assigning significance, are as follows:

Construction

- **Wider population (rural context)** – changes to air quality (moderate adverse), noise (moderate adverse), landscape amenity (moderate adverse) and demolition (large adverse).
- **Wider population (urban context)** – changes to landscape amenity (moderate adverse) and demolition (moderate adverse).
- **Families with children and adolescents** – changes to air quality (moderate adverse), safety (moderate adverse), access (moderate adverse), noise (moderate adverse), separation from open space and recreational routes (moderate adverse) and changes in landscape amenity (large adverse). Separate moderate adverse in-combination residual cumulative effects due to traffic impacts for the duration of the M5 J10 slip road closures and signed diversions.
- **People who are physically disadvantaged** – changes to air quality (moderate adverse), safety (moderate adverse), access (moderate adverse, noise (moderate adverse), separation from open space and recreational routes (moderate adverse) and changes in landscape amenity (large adverse).
- **People who are materially disadvantaged** – changes to safety (moderate adverse), access (moderate adverse) and vocational training opportunities through

construction work (moderate beneficial).

- **People from black and minority ethnic groups** – changes to safety (moderate adverse), access (moderate adverse) and vocational training opportunities through construction work (moderate beneficial).
- **Residents of properties at Uckington, Moat Lane and Cooks Lane** – changes to access arrangements (moderate adverse) and changes to landscape amenity (very large adverse). Separate moderate adverse in-combination residual cumulative effects due to traffic impacts for the duration of the M5 J10 slip road closures and signed diversions.
- **Residents of properties at Homecroft Drive and Appleyard Close** – changes to access arrangements (moderate adverse) and demolition of properties (very large adverse).
- **Residents of properties at Withybridge Gardens, Withybridge Lane and Stanboro Lane** – changes to landscape amenity (very large adverse) and demolition of properties (very large adverse).
- **Users of PRoW and WCH** – changes in access arrangements (moderate adverse); separation from open space and recreational routes (moderate adverse); changes to safety due to the presence of construction works (moderate adverse); and changes to the landscape amenity (large adverse).
- **Employers and employees to businesses adjacent to the A4019** – changes in access arrangements (moderate adverse) and changes in landscape amenity (large adverse).

Operation

- **Families with children and adolescents** – access improvements for a range of modes and to community facilities (moderate beneficial in OY and large beneficial in FY) and improvements to safety (moderate beneficial in OY and FY).
- **People who are physically disadvantaged** – access improvements for a range of modes and to community facilities (moderate beneficial in OY and large beneficial in FY) and improvements to safety (moderate beneficial in OY and FY).
- **People who are materially disadvantaged** – access improvements for a range of modes and to community facilities (moderate beneficial in OY and large beneficial in FY) and improvements to safety (moderate beneficial in OY and FY).
- **People from black and minority ethnic groups** – access improvements for a range of modes and to community facilities (moderate beneficial in OY and large beneficial in FY) and improvements to safety (moderate beneficial in OY and FY).
- **Residents of Uckington, Moat Lane and Cooks Lane** – changes in landscape amenity (moderate adverse in FY) and access improvements for a range of modes and to community facilities (large beneficial in OY and very large beneficial in FY).
- **Residents of properties adjacent to the B4634** – changes in landscape amenity (moderate adverse in FY) and access improvements for a range of modes and to community facilities (moderate beneficial in OY and large beneficial in FY).
- **Residents of properties at Withybridge Gardens, Withybridge Lane and Stanboro Lane** – changes in landscape amenity (moderate adverse in FY) and access improvements for a range of modes and to community facilities (moderate beneficial in OY and large beneficial in FY).
- **Users of PRoW and WCH** – improved safety (large beneficial in OY and FY) and access improvements for a range of modes and to community facilities (large beneficial in OY and very large beneficial in FY).

Climate

15.9.25. For the climate assessment, the intra-Scheme in-combination aspect of the CEA is scoped out.

15.9.26. For the assessment of vulnerability to climate change, potential for intra-Scheme in-combination cumulative effects has been identified in relation to the following:

- Intensification of air quality impacts, due to emissions and hotter summers combining to increase the formation of ground level ozone.
- Reduced road salting, providing benefit for the water environment.
- Lower river levels, intensifying impacts from surface water runoff discharges.
- More polluted surface water runoff impacting water environment.

15.9.27. Intensification of air quality impacts due to climate change are considered likely to be offset by the predicted future fleet-wide shift toward electric and hybrid vehicles. The reduced requirement for road salting would manifest as a benefit. The SuDS for the Scheme has been designed to allow for anticipated climate change impacts and does not rely upon dilution to avoid environmental impacts. The SuDS also incorporates filtration and biological treatment within storage areas, which will address the risk of polluted surface water runoff. The assessment concludes that none of these intra-Scheme cumulative effects will be significant.

15.10. Inter-project – assessment of cross-topic effects

15.10.1. Table 15-6 sets out the potential inter-project (different project) cumulative effects by topic for each of the shortlisted other developments during the construction and operational phases of the Scheme.

15.10.2. It should be noted that not all of the topics linked to RFFPs in the short-list as having the potential for impact interactions have then been carried forward to appear in the summary of impacts leading to cumulative inter-project effects. This is particularly the case for air quality, water, waste and materials. For these topics, the specialist chapters provide a narrative to explain why the shortlisted RFFPs have not actually been scoped into further assessment. Typically for air quality and water, this is due to a combination of the requirements for all developers to adhere to national level (or above) environmental legislation governing the control of pollutants to air and water. For waste and materials, this is due to the negligible likelihood of individual RFFPs that are not of a strategic scale of development on the shortlist being of a sufficient scale or operating in the same construction timeframe such that they would compete for the same type of materials or availability of waste management infrastructure, particularly as waste and materials budgets are typically assessed at a pan-regional scale.

15.10.3. The climate topic has been scoped out of all of the RFFPs. The assessment notes that the effects of GHG emissions are essentially cumulative, with their concentration in the atmosphere rather than actual emissions levels being what determines the warming effect; and reporting that shortlisted RFFPs will not affect the likelihood of climate hazards or their consequences on the Scheme in ways that have not already been considered within the climate vulnerability assessment.

Table 15-6 – Inter-project (different project) cumulative effects for each shortlisted RFFP during operation and construction

Development	Air Quality	Biodiversity	Cultural Heritage	Climate	Geology and Soils	Landscape and Visual	Materials and Waste	Noise and Vibration	Population and Human Health	Road Drainage and Water Environment
21/00396/CLE Address: Denhill, Colmans Farm, Elmstone Hardwicke, Tewkesbury, Gloucestershire, GL51 9TG Certificate of Lawfulness to establish use of land for the siting of a mobile home for permanent residential use (use class C3) and associated garden land and vehicular parking area.	Yes	-	-	-	-	-	-	-	-	-
	Residual inter-project cumulative effects									
	Based on the fact that only one topic has reported a potential cumulative effect, this RFFP is scoped out of further cross-topic analysis. The single impact is addressed in the relevant chapter.									
22/01377/FUL Address: Land At Manor Farm, Stoke Road, Stoke Orchard, Cheltenham, Gloucestershire, GL52 7RY Erection of up to 9nos. residential properties – full planning application based on granted permission in principle (21/01011/PIP).	Yes	-	-	-	-	-	-	Yes	Yes	-
	Residual inter-project cumulative effects									
	The single topic impacts are addressed in the relevant chapters. The topic assessments indicate the potential for the RFFP to influence the Scheme in relation to population and human health through the introduction of new residential receptors within established communities. It is assumed that the developer will adhere to all relevant environmental legislation, which will ensure that no significant adverse residual cumulative effects will arise; and that traffic effects of the RFFP will be adequately addressed as part of the consenting process. The Scheme is noted to have the potential to exert an impact on the RFFP in relation to experience of noise (as a receptor for construction noise in particular), air quality (as a receptor – due to proximity to the ARN); and population and human health (as a receptor within an identified community cluster). In all instances, the effects anticipated from the Scheme are comparable to those noted for the residential community of this part of the study area. No significant cumulative effects have been noted within the contributing topic assessments for these RFFPs and therefore no significant cross-topic cumulative inter-project effects are predicted. No essential mitigation is required. The residual assessment is a negligible minor cumulative inter-project effect, which is not significant.									
20/00213/FUL Address: Manor Farm Yard, Stoke Road, Stoke Orchard, Cheltenham, Gloucestershire, GL52 7RY Redevelopment of the site including demolition of existing buildings and erection of 3 No. (B1 and B8) units and associated works.	Yes	-	-	-	-	-	-	Yes	-	-
	Residual inter-project cumulative effects									
	Based on the fact that only one topic has reported a significant cumulative effect, this RFFP is scoped out of further cross-topic analysis. The single impact is addressed in the relevant chapter.									
19/00937/PDAD Address: The Barn, Hayden Lane, Boddington, Cheltenham, Gloucestershire, GL51 0SR Prior approval for conversion of agricultural buildings into 1no. larger residential property (use class C3) and associated building operations. (Re-submission of previously approved application 19/00342/PDAD for amendments to fenestration to facilitate a first floor).	Yes	Yes	-	-	-	-	-	Yes	Yes	Yes
	Residual inter-project cumulative effects									
	The topic assessments indicate the potential for the RFFP to influence the Scheme in relation to potential interaction with watercourses upstream of the Scheme; and cumulative impacts on barn owl habitat (additive with the Scheme). The Scheme is noted to have the potential to exert an impact on the RFFP in relation to biodiversity (barn owl habitat), experience of noise (as a receptor for construction noise in particular), air quality (as a receptor, due to proximity to the ARN) and population and human health (as a receptor within an identified community cluster). In all instances, the effects anticipated from the Scheme are comparable to those noted for the barn owl population across the study area and the residential community of this part of the study area. No significant cumulative effects have been noted within the contributing topic assessments for these RFFPs and therefore no significant cross-topic cumulative inter-project effects are predicted.									

Development	Air Quality	Biodiversity	Cultural Heritage	Climate	Geology and Soils	Landscape and Visual	Materials and Waste	Noise and Vibration	Population and Human Health	Road Drainage and Water Environment
	No essential mitigation is required. The residual assessment is a negligible minor cumulative inter-project effect, which is not significant.									
19/00907/PDAD Address: A & B Buildings At Pilgrove Farm, Pilgrove Farm, B4634 Boddington, Cheltenham, Gloucestershire, GL51 0SW Prior approval for conversion of agricultural buildings into 2no. larger residential properties (use class C3) and associated building operations.	Yes	Yes	-	-	-	Yes	-	Yes	Yes	Yes
	Residual inter-project cumulative effects									
	The topic assessments indicate the potential for the RFFP to influence the Scheme in relation to potential interaction with watercourses upstream of the Scheme; and cumulative impacts on barn owl habitat (additive with the Scheme). The Scheme is noted to have the potential to exert an impact on the RFFP in relation to biodiversity (barn owl habitat) landscape (as a visual receptor), experience of noise (as a receptor for construction noise in particular), air quality (as a receptor, due to proximity to the ARN) and population and human health (as a receptor within an identified community cluster). In all instances, the effects anticipated from the Scheme are comparable to those noted for the barn owl population across the study area and the residential community of this part of the study area. No significant cumulative effects have been noted within the contributing topic assessments for these RFFPs and therefore no significant cross-topic cumulative inter-project effects are predicted. No essential mitigation is required. The residual assessment is a negligible minor cumulative inter-project effect, which is not significant.									
22/02172/FUL Address: Pilgrove Cottage, Old Gloucester Road, Cheltenham, Gloucestershire, GL51 0SW Proposed development of 4 detached 5-bedroomed houses within internal garages, 3 external parking spaces and external landscaping.	Yes	Yes	-	-	-	Yes	-	Yes	Yes	Yes
	Residual inter-project cumulative effects									
	The topic assessments indicate the potential for the RFFP to influence the Scheme in relation to potential interaction with watercourses upstream of the Scheme; and cumulative impacts on protected species (additive with the Scheme). The Scheme is noted to have the potential to exert an impact on the RFFP in relation to biodiversity (protected species habitat loss), landscape (as a visual receptor), experience of noise (as a receptor for construction noise in particular), air quality (as a receptor, due to proximity to the ARN) and population and human health (as a receptor within an identified community cluster). In all instances, the effects anticipated from the Scheme are comparable to those noted for the relevant protected species populations across the study area and the residential community of this part of the study area. No significant cumulative effects have been noted within the contributing topic assessments for these RFFPs and therefore no significant cross-topic cumulative inter-project effects are predicted. No essential mitigation is required. The residual assessment is a negligible minor cumulative inter-project effect, which is not significant.									
20/00003/FUL Address: The Old School House, Stoke Road, Stoke Orchard, Cheltenham, Gloucestershire, GL52 7RY Erection of a replacement residential property (amended)	-	-	-	-	-	-	-	Yes	Yes	-
	Residual inter-project cumulative effects									
	The topic assessments indicate no potential for the RFFP to influence the Scheme in relation to cumulative impacts. The Scheme is noted to have the potential to exert an impact on the RFFP in relation to population and human health (as a receptor within an identified community cluster) and noise and vibration (as a receptor).									

Development	Air Quality	Biodiversity	Cultural Heritage	Climate	Geology and Soils	Landscape and Visual	Materials and Waste	Noise and Vibration	Population and Human Health	Road Drainage and Water Environment
	In all instances, the effects anticipated from the Scheme are comparable to those noted across the study area and residential communities north of the A4019. No significant cumulative effects have been noted within the contributing topic assessments for these RFFPs and therefore no significant cross-topic cumulative inter-project effects are predicted. No essential mitigation is required. The residual assessment is a negligible minor cumulative inter-project effect, which is not significant.									
22/00549/FUL Address: Gloucester Old Spot Public House, A4019 Tewkesbury Road, Elmstone Hardwicke, Cheltenham, Gloucestershire, GL51 9SY Extension of existing car park, creation of motorhome parking area and addition of new access point.	-	-	-	-	-	-	-	Yes	Yes	-
	Residual inter-project cumulative effects									
	The topic assessments indicate the potential for the RFFP to influence the Scheme in relation to cumulative impacts on population, in terms of increasing capacity at an identified business receptor. The Scheme is noted to have the potential to exert an impact on the RFFP in relation to noise and vibration (as a receptor), and population and human health (as a receptor within an identified business location). In both instances, the effects anticipated from the Scheme are comparable to those noted for the existing Gloucester Old Spot Public House receptor location. No significant cumulative effects have been noted within the contributing topic assessments for these RFFPs and therefore no significant cross-topic cumulative inter-project effects are predicted. No essential mitigation is required. The residual assessment is a negligible minor cumulative inter-project effect, which is not significant.									
23/00328/OUT Address: Knightsbridge Nurseries, A4019 Tewkesbury Road, Elmstone Hardwicke, Cheltenham, Gloucestershire, GL51 9SY Outline application for up to 46 affordable dwellings with all matters reserved except access.	Yes	-	-	-	-	-	-	Yes	Yes	-
	Residual inter-project cumulative effects									
	The topic assessments indicate the potential for the RFFP to influence the Scheme in relation to cumulative impacts on population, in terms of changing a business receptor into a residential receptor and thus altering the baseline and use of the site. The Scheme is noted to have the potential to exert an impact on the RFFP in relation to noise and vibration (as a receptor), air quality (as a receptor) and population and human health (as a new residential receptor replacing an identified business location). In all instances, the effects anticipated from the Scheme are comparable to those noted for the existing residential communities in this part of the study area. No significant cumulative effects have been noted within the contributing topic assessments for these RFFPs and therefore no significant cross-topic cumulative inter-project effects are predicted. No essential mitigation is required. The residual assessment is a negligible minor cumulative inter-project effect, which is not significant.									
20/02132/FUL Address: Warners Of Cheltenham, Blaisdon Way, Cheltenham, Gloucestershire, GL51 0WH Erection of 12 no. business incubator units with flexible B2, B8, E(a)(c)(e) and (g) use.	Yes	Yes	-	-	-	-	-	Yes	Yes	Yes
	Residual inter-project cumulative effects									
	The topic assessments indicate the potential for the RFFP to influence the Scheme in relation to cumulative impacts on biodiversity (the impact on the River Chelt), the water environment (upstream of the Scheme), noise and vibration (as a potential source of additional noise), plus air quality (as a potential source of additional traffic generation) and population (generating a new business receptor). It is assumed that the developer will adhere to all relevant environmental legislation, which will ensure that no significant adverse residual cumulative effects will arise; and that traffic effects of the RFFP will be adequately addressed as part of the consenting process. The Scheme is noted to have the potential to exert an impact on the RFFP in relation to noise and vibration (as a new receptor), and population and human health (as a receptor within an identified community cluster). In all instances, the effects anticipated from the Scheme are comparable to those noted for the residential communities in this part of the study. No significant cumulative effects have been noted within the contributing topic assessments for these RFFPs and therefore no significant cross-topic cumulative inter-project effects are predicted. No essential mitigation is required. The residual assessment is a negligible minor cumulative inter-project effect, which is not significant.									
22/01272/FUL	Yes	Yes	-	-	-	Yes	-	Yes	Yes	Yes

Development	Air Quality	Biodiversity	Cultural Heritage	Climate	Geology and Soils	Landscape and Visual	Materials and Waste	Noise and Vibration	Population and Human Health	Road Drainage and Water Environment
Address: Pigeon House Farm, The Green, Uckington, Cheltenham, Gloucestershire, GL52 9QB Full application for the removal of an agricultural building and the erection of 4 residential properties and associated access (reserved matters application to ref: 18/01218/OUT - permitted 20 March 2020) (permitted 16 Sep 2022). Proposed development of 4 detached 5-bedroomed houses with internal garages. 3 external car parking spaces and external landscaping (permitted 4 Mar 2023). Minor amendment to approved proposals for Site Plan & Units ¾ only, updating layout and external appearance in accordance with included revised plans and elevations and discharge of condition 1 of 22/00466/FUL.	Residual inter-project cumulative effects The topic assessments indicate the potential for the RFFP to influence the Scheme in relation to potential interaction with watercourses upstream of the Scheme; and cumulative impacts on bats and barn owl habitat (additive with the Scheme). The Scheme is noted to have the potential to exert an impact on the RFFP in relation to biodiversity (bat and barn owl habitat) landscape (as a visual receptor), experience of noise (as a receptor for construction noise in particular), water (within the same catchment), air quality (as a receptor, due to proximity to the ARN) and population and human health (as a receptor within an identified community cluster). In all instances, the effects anticipated from the Scheme are comparable to those noted for the bat and barn owl populations across the study area, the water environment and the residential community of this part of the study area. No significant cumulative effects have been noted within the contributing topic assessments for these RFFPs and therefore no significant cross-topic cumulative inter-project effects are predicted. No essential mitigation is required. The residual assessment is a negligible minor cumulative inter-project effect, which is not significant.									
22/01163/FUL Address: Uckington Farm, The Green, Uckington, Cheltenham, Gloucestershire, GL51 9SR Demolition of agricultural buildings and erection of 16 dwellings, creation of access, landscaping and associated works.	Yes	Yes	-	-	-	Yes	-	Yes	Yes	Yes
	Residual inter-project cumulative effects The topic assessments indicate the potential for the RFFP to influence the Scheme in relation to potential interaction with watercourses upstream of the Scheme; biodiversity – loss of habitat of known protected species (additive impacts); noise (as an additional source of construction noise and traffic generation); air quality (as an additional source of construction dust and traffic generation); and population and human health (as an additional residential receptor). It is assumed that the developer will adhere to all relevant environmental legislation, which will ensure that no significant adverse residual cumulative effects will arise; and that traffic effects of the RFFP will be adequately addressed as part of the consenting process. The Scheme is noted to have the potential to exert an impact on the RFFP in relation to biodiversity – loss of habitat of known protected species (additive impacts), landscape (as a visual receptor), experience of noise (as a receptor for construction noise in particular), water (within the same catchment), air quality (as a receptor, due to proximity to the ARN) and population and human health (as a receptor within an identified community cluster). In all instances, the effects anticipated from the Scheme are comparable to those noted for the relevant protected species populations across the study area, the water environment and the residential community of this part of the study area. No significant cumulative effects have been noted within the contributing topic assessments for these RFFPs and therefore no significant cross-topic cumulative inter-project effects are predicted. No essential mitigation is required. The residual assessment is a minor cumulative inter-project effect, which is not significant.									
16/02000/OUT Elms Park, North West Cheltenham Off the A4019, Uckington Outline application for up to 4,115 new homes providing a range and choice of mix and tenure. Relates to land allocated under Policy A4: North West Cheltenham Development Area (allocation for 4,285 homes and 23 hectares of business use)	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes
	Residual inter-project cumulative effects All topic assessments aside from climate indicate the potential for the RFFP to influence the Scheme in relation to potential interactions, as follows. Air quality – increased trip generation (additive impacts); biodiversity – loss of habitat of known protected species (additive impacts); cultural heritage – impacts on the setting of a Scheduled Monument and archaeological resource (additive impacts); geology and soils – loss of agricultural soils (additive impacts); landscape and visual – changes to landscape character (in-combination impacts); materials and waste – demand (additive impacts); noise and vibration – construction activities and increased trip generation (additive impacts); population and human health – new receptors and demand on existing facilities and services (in-combination impacts); road drainage and water environment – interaction with Leigh Brook (flow and contamination changes) (in-combination impacts). The Scheme is noted to have the potential to exert an impact on the RFFP in relation to all topics except climate. Principal interactions noted are as follows: Air quality – RFFP residents as receptors (additive impacts); biodiversity – loss of habitat of known protected species (additive impacts); cultural heritage – impacts on the setting of a Scheduled Monument and archaeological resource (additive impacts); geology and soils – loss of agricultural soils (additive impacts); landscape and visual – changes to landscape character (in-combination impacts); materials and waste – demand (additive impacts); population and human health – new receptors and demand on existing facilities and services (in-combination impacts); road drainage and water environment – interaction with Leigh Brook (in-combination impacts). The scale of the interactions noted has resulted in a more detailed consideration of the implications of the potential cumulative impacts identified. This is provided in a narrative that follows this table.									
17/00827/FUL and 17/01459/FUL (same application made to two authorities – TBC and CBC)	Yes	-	-	-	Yes	Yes	-	Yes	Yes	Yes

Development	Air Quality	Biodiversity	Cultural Heritage	Climate	Geology and Soils	Landscape and Visual	Materials and Waste	Noise and Vibration	Population and Human Health	Road Drainage and Water Environment
Address: Gallagher Retail Park, A4019, Uckington, Cheltenham, Gloucestershire, GL51 9RR Erection of a Class A1 retail unit comprising 929 sqm at ground floor with full cover mezzanine (total floorspace 1,858 sqm), car parking, re-alignment of service yard access, renewal/adjustment of service yard drainage, diversion of a Class 5 highway, and associated works to the west of Unit A Gallagher Retail Park.	Residual inter-project cumulative effects The topic assessments indicate the potential for the RFFP to influence the Scheme in relation to potential interaction with watercourses upstream of the Scheme; geology and soils (potential for the mobilisation of contaminants), noise and vibration (as an additional source point), air quality (as an additional trip generator), landscape (due to an interaction between boundary planting and Scheme footpath proposals), and population and human health (as an additional business receptor). It is assumed that the developer will adhere to all relevant environmental legislation, which will ensure that no significant adverse residual cumulative effects will arise; and that traffic effects of the RFFP will be adequately addressed as part of the consenting process. The Scheme is noted to have the potential to exert an impact on the RFFP in relation to geology and soils (as a receptor, proximate to Scheme construction works), landscape (relating to interaction between the boundary planting and Scheme footpath proposals) and population and human health (as a receptor within Gallagher Retail Park). In all instances, the effects anticipated from the Scheme are comparable to those noted for the relevant topics at Gallagher Retail Park. No significant cumulative effects have been noted within the contributing topic assessments for these RFFPs and the landscape interaction is considered suitable for resolution through detailed design. Therefore, no significant cross-topic cumulative inter-project effects are predicted. No essential mitigation is required. The residual assessment is a negligible minor cumulative inter-project effect, which is not significant.									
20/00759/FUL Address: Swindon Farm, A4019, Cheltenham, Gloucestershire (part of the North West Cheltenham Development Area (allocation for 4285 homes and 23 hectares of business use)) Demolition of a residential property and the erection of 266 residential properties (Use Class C3), new vehicular and pedestrian access off Manor Road, attenuation basin and ancillary infrastructure.	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes
	Residual inter-project cumulative effects The majority of topic assessments indicate the potential for the RFFP to influence the Scheme. Potential interactions are cited as follows. air quality – construction activities and increased trip generation (additive impacts), biodiversity – loss of habitat of known protected species (additive impacts); cultural heritage – impacts on the archaeological resource (additive impacts); geology and soils – loss of agricultural soils (additive impacts); noise and vibration – construction activities and increased trip generation (additive impacts); population and human health – new receptors and demand on existing facilities and services (in-combination impacts); road drainage and water environment – interaction with watercourses (flow and contamination changes) (in-combination impacts). The Scheme is noted to have the potential to exert an impact on the RFFP in relation to a number of topics. Principal interactions noted are as follows: biodiversity – loss of habitat of known protected species (additive impacts); cultural heritage – impacts on the archaeological resource (additive impacts); geology and soils – loss of agricultural soils (additive impacts); landscape and visual – changes to landscape character (in-combination impacts); materials and waste – demand (additive impacts); population and human health – new receptors and demand on existing facilities and services (in-combination impacts); road drainage and water environment – interaction with watercourses (in-combination impacts). The scale of the interactions noted has resulted in a more detailed consideration of the implications of the potential cumulative impacts identified. This is provided in a narrative that follows this table.									
19/00113/COU Carpetright Plc, Unit M, Gallagher Retail Park, A4019, Cheltenham, Gloucestershire, GL51 9RR Change of use of Unit M from Class A1 (retail) to Class D2 (Leisure & Assembly) to create a gym.	Yes	-	-	-	-	-	-	-	Yes	-
	Residual inter-project cumulative effects The topic assessments indicate the potential for the RFFP to influence the Scheme in relation to potential interaction with air quality (as an additional trip generator) and population and human health (as an additional business receptor). It is assumed that the developer will adhere to all relevant environmental legislation, which will ensure that no significant adverse cumulative effects will arise; and that traffic effects of the RFFP will be adequately addressed as part of the consenting process. The Scheme is noted to have the potential to exert an impact on the RFFP in relation to population and human health (as a receptor within Gallagher Retail Park). In all instances, the effects anticipated from the Scheme are comparable to those noted for the relevant topics at Gallagher Retail Park. No significant cumulative effects have been noted within the contributing topic assessments for these RFFPs and therefore no significant cross-topic cumulative inter-project effects are predicted. No essential mitigation is required. The residual assessment is a negligible minor cumulative inter-project effect, which is not significant.									
19/01260/OUT Address: Land north-west Manor Road, Runnings Road, Cheltenham, Gloucestershire Outline application for the construction of light industrial units (use class B1) including the creation of a vehicular access point, with all other matters reserved for future consideration	Yes	-	-	-	Yes	-	-	-	Yes	Yes
	Residual inter-project cumulative effects The topic assessments indicate the potential for the RFFP to influence the Scheme in relation to potential interaction with air quality (as an additional trip generator), water environment (interaction with Leigh Brook), population and human health (as an additional business receptor) and geology and soils (potential mobilisation of contaminants). It is									

Development	Air Quality	Biodiversity	Cultural Heritage	Climate	Geology and Soils	Landscape and Visual	Materials and Waste	Noise and Vibration	Population and Human Health	Road Drainage and Water Environment
	assumed that the developer will adhere to all relevant environmental legislation, which will ensure that no significant adverse cumulative effects will arise; and that traffic effects of the RFFP will be adequately addressed as part of the consenting process. The Scheme is noted to have the potential to exert an impact on the RFFP in relation to population and human health (as a receptor within Gallagher Retail Park) and geology and soils (in relation to contamination). In all instances, the effects anticipated from the Scheme are comparable to those noted for the relevant topics at Gallagher Retail Park. No significant cumulative effects have been noted within the contributing topic assessments for these RFFPs and therefore no significant cross-topic cumulative inter-project effects are predicted. No essential mitigation is required. The residual assessment is a negligible minor cumulative inter-project effect, which is not significant.									
21/02120/FUL Address: Gallagher Retail Park, A4019, Cheltenham, Gloucestershire Erection a restaurant unit with drive-through lane and associated car parking, layout and landscaping amendments.	Yes	-	-	-	Yes	-	-	Yes	Yes	Yes
	Residual inter-project cumulative effects									
	The topic assessments indicate the potential for the RFFP to influence the Scheme in relation to potential interaction with air quality and noise (as an additional trip generator), geology and soils (contamination risk) water environment (interaction with Leigh Brook) and population and human health (as an additional business receptor). It is assumed that the developer will adhere to all relevant environmental legislation, which will ensure that no significant adverse cumulative effects will arise; and that traffic effects of the RFFP will be adequately addressed as part of the consenting process. The Scheme is noted to have the potential to exert an impact on the RFFP in relation to geology and soils (proximity to construction works) and population and human health (as a receptor within Gallagher Retail Park). In all instances, the effects anticipated from the Scheme are comparable to those noted for the relevant topics at Gallagher Retail Park. No significant cumulative effects have been noted within the contributing topic assessments for these RFFPs and therefore no significant cross-topic cumulative inter-project effects are predicted. No essential mitigation is required. The residual assessment is a negligible minor cumulative inter-project effect, which is not significant.									
23/00354/OUT Home Farm, Quat Goose Lane, Cheltenham, Gloucestershire, GL51 9RP Outline application for the erection of up to 180 residential units, including provision of vehicular and pedestrian access, green infrastructure and associated works. Appearance, landscaping, layout and scale are matters reserved for future consideration. Relates to land allocated under Policy A4: North West Cheltenham Development Area (allocation for 4,285 homes and 23 hectares of business use)	Yes	-	-	-	-	-	-	Yes	Yes	-
	Residual inter-project cumulative effects									
	The topic assessments indicate the potential for the RFFP to influence the Scheme in relation to potential interaction with air quality and noise (as an additional trip generator), and population and human health (as an additional residential receptor). It is assumed that the developer will adhere to all relevant environmental legislation, which will ensure that no significant adverse cumulative effects will arise; and that traffic effects of the RFFP will be adequately addressed as part of the consenting process. The Scheme is noted to have the potential to exert an impact on the RFFP in relation to population and human health (as a new residential receptor). In all instances, the effects anticipated from the Scheme are comparable to those noted for the relevant topics for communities north of Gallagher Retail Park and in the north-west of Cheltenham. No significant cumulative effects have been noted within the contributing topic assessments for these RFFPs and therefore no significant cross-topic cumulative inter-project effects are predicted. No essential mitigation is required. The residual assessment is a negligible minor cumulative inter-project effect, which is not significant.									
22/00164/PIP Address: Land Known as Evergreen Spiritual Pathways, The Green, Uckington, Cheltenham, Gloucestershire, GL51 9SS Permission in principle application for the erection of up to 3 residential properties	Yes	-	-	-	-	-	-	Yes	Yes	Yes
	Residual inter-project cumulative effects									
	The topic assessments indicate the potential for the RFFP to influence the Scheme in relation to potential interaction with watercourses upstream of the Scheme. The Scheme is noted to have the potential to exert an impact on the RFFP in relation to landscape (as a visual receptor), air quality (as a receptor for changes to air quality), experience of noise (as a receptor for construction noise in particular), water (within the same catchment) and population and human health (as a receptor within an identified community cluster). In all instances, the effects anticipated from the Scheme are comparable to those noted for the residential community of this part of the study area. No significant cumulative effects have been noted within the contributing topic assessments for these RFFPs and therefore no significant cross-topic cumulative inter-project effects are predicted. No essential mitigation is required. The residual assessment is a negligible minor cumulative inter-project effect, which is not significant.									

Development	Air Quality	Biodiversity	Cultural Heritage	Climate	Geology and Soils	Landscape and Visual	Materials and Waste	Noise and Vibration	Population and Human Health	Road Drainage and Water Environment
22/00474/FUL Address: Douglas Equipment, Village Road, Cheltenham, Gloucestershire, GL51 0AB Demolition of existing buildings and erection of 71 residential properties, including access, car parking, landscaping and associated works	Yes	-	-	-	-	-	-	Yes	Yes	Yes
	Residual inter-project cumulative effects									
	The topic assessments indicate the potential for the RFFP to influence the Scheme in relation to potential interaction with air quality and noise (as an additional trip generator and point source), population and human health (as an additional sizeable residential receptor) and water environment (impacts to watercourses). The Scheme is noted to have the potential to exert an impact on the RFFP in relation to the experience of noise (as a receptor for construction noise in particular) and population and human health (as a receptor within an identified community cluster). In all instances, the effects anticipated from the Scheme are comparable to those noted for the water environment and the residential community of this part of the study area. No significant cumulative effects have been noted within the contributing topic assessments for these RFFPs and therefore no significant cross-topic cumulative inter-project effects are predicted. No essential mitigation is required. The residual assessment is a negligible minor cumulative inter-project effect, which is not significant.									
21/02832/OUT Lansdown Industrial Estate, Gloucester Road, Cheltenham, Gloucestershire Outline application for the redevelopment of the northern part of Lansdown Industrial Estate for up to 215 dwellings with associated access roads, parking and public open space following the demolition of the existing buildings. All matters reserved except for access. Relates to land allocated under Policy H2 of the Cheltenham Local Plan.	Yes	-	-	-	-	-	-	Yes	Yes	-
	Residual inter-project cumulative effects									
	The topic assessments indicate the potential for the RFFP to influence the Scheme in relation to population and human health (as an additional sizeable residential receptor) and air quality and noise (as a potential additional trip generator). The Scheme is noted to have the potential to exert an impact on the RFFP in relation to population and human health (as a receptor within an identified community cluster). In all instances, the effects anticipated from the Scheme are comparable to those noted the residential community of this part of the study area. No significant cumulative effects have been noted within the contributing topic assessments for these RFFPs and therefore no significant cross-topic cumulative inter-project effects are predicted. No essential mitigation is required. The residual assessment is a negligible minor cumulative inter-project effect, which is not significant.									
22/00947/FUL Hayden Hill Fruit Farm, Old Gloucester Road, Boddington, Cheltenham, Gloucestershire, GL51 0SW Erection of replacement dwelling following demolition of existing barn and existing bungalow	-	Yes	-	-	-	-	-	-	Yes	-
	Residual inter-project cumulative effects									
	Based on the fact that neither topic has reported a significant cumulative effect, this RFFP is scoped out of further cross-topic analysis. The single impacts are addressed in the relevant chapters.									
Gloucestershire Waste Core Strategy[7] - Policy WCS6: Wingmoor Farm East, a strategic waste management development site. Address: Wingmoor Farm East, Orchard Rd, Bishops Cleeve, Cheltenham GL52 7DG, United Kingdom	Yes	-	-	-	-	-	-	-	-	-
	Residual inter-project cumulative effects									
	Based on the fact that only one topic has reported a potential cumulative effect, this RFFP is scoped out of further cross-topic analysis. The single impact is addressed in the relevant chapter.									
Gloucestershire Waste Core Strategy Core Policy WCS6 – The Park, a strategic waste management development site. Address: Unit 6, The Aerodrome, Stoke Rd, Cheltenham GL52 7RS, United Kingdom	Yes	-	-	-	-	-	-	-	-	-
	Residual inter-project cumulative effects									
	Based on the fact that only one topic has reported a potential cumulative effect, this RFFP is scoped out of further cross-topic analysis. The single impact is addressed in the relevant chapter.									
Gloucestershire Waste Core Strategy Core Policy WCS6 – Wingmoor Farm West, a strategic waste management development site. Address: Lowdilow Ln, Cheltenham GL52 7RS, United Kingdom	Yes	-	-	-	-	-	-	-	-	-
	Residual inter-project cumulative effects									
	Based on the fact that only one topic has reported a potential cumulative effect, this RFFP is scoped out of further cross-topic analysis. The single impact is addressed in the relevant chapter.									

[7] Gloucestershire County Council. November 2012. Gloucestershire Waste Core Strategy. Available at: adopted_wcs_211112-53886.pdf (gloucestershire.gov.uk)

Development	Air Quality	Biodiversity	Cultural Heritage	Climate	Geology and Soils	Landscape and Visual	Materials and Waste	Noise and Vibration	Population and Human Health	Road Drainage and Water Environment
Joint Core Strategy safeguarded land[8] Policy SD5 safeguarded land to the north-west of Cheltenham (north-east of M5 J10) Development proposal being promoted by private sector for residential development. No plans yet publicly available for review.	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes
	Residual inter-project cumulative effects									
	All topic assessments except climate indicate the potential for the RFFP to influence the Scheme in relation to potential interactions, as follows. Air quality – increased trip generation (additive impacts); biodiversity – loss of habitat of known protected species (additive impacts); cultural heritage – impacts on archaeological resource (additive impacts); geology and soils – loss of agricultural soils (additive impacts); landscape and visual – changes to land use and landscape character (in-combination impacts); materials and waste – demand (additive impacts); noise and vibration – construction activities and increased trip generation (additive impacts); population and human health – new receptors and demand on existing facilities and services (in-combination impacts); road drainage and water environment – interaction with watercourses (flow and contamination changes) (in-combination impacts). The Scheme is noted to have the potential to exert an impact on the RFFP in relation to all topics. Principal interactions noted are as follows: Air quality – RFFP residents as receptors (additive impacts); biodiversity – loss of habitat of known protected species (additive impacts); cultural heritage – impacts on archaeological resource (additive impacts); geology and soils – loss of agricultural soils (additive impacts); landscape and visual – changes to landscape character (in-combination impacts); materials and waste – demand (additive impacts); noise and vibration – RFFP residents as receptors (additive impacts); population and human health – new receptors and demand on existing facilities and services (in-combination impacts); road drainage and water environment – interaction with watercourses (in-combination impacts). The scale of the interactions noted has resulted in a more detailed consideration of the implications of the potential cumulative impacts identified. This is provided in a narrative that follows this table.									
22/01817/OUT and 22/01107/OUT (same application to two authorities – CBC and TBC, respectively) Joint Core Strategy Allocation Policy A7 West Cheltenham Development Area Outline planning application for residential development comprising a mixture of market and affordable housing (use class C3), which could include retirement/extra care accommodation (use class C2/C3) a flexible mixed use area with a community hub (including potentially use classes E, F1 and F2),a primary school and children's nursery to include use of sports pitches to provide public recreation space, site clearance and preparation, green infrastructure, walking and cycle routes, formal and informal public open space, sports pitch provision, drainage and other associated works and infrastructure, including utilities and highways works. All matters reserved except partially for access. This application relates to a parcel of land within the West Cheltenham Development Area, which is a JCS allocation. Policy A7 of the JCS applies – it expects the delivery of approximately 1,100 residential homes and 45 ha. of business development, focussed on a cyber security hub.	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes
	Residual inter-project cumulative effects									
	All topic assessments except climate indicate the potential for the RFFP to influence the Scheme in relation to potential interactions, as follows. Air quality – increased trip generation (additive impacts); biodiversity – loss of habitat of known protected species (additive impacts); cultural heritage – impacts on archaeological resource (additive impacts); geology and soils – loss of agricultural soils (additive impacts); landscape and visual – changes to landscape character (in-combination impacts); materials and waste – demand (additive impacts); noise and vibration – construction activities and increased trip generation (additive impacts); population and human health – new receptors and demand on existing facilities and services (in-combination impacts); road drainage and water environment – interaction with watercourses (flow and contamination changes) (in-combination impacts). The Scheme is noted to have the potential to exert an impact on the RFFP in relation to all topics. Principal interactions noted are as follows: Air quality – RFFP residents as receptors (additive impacts); biodiversity – loss of habitat of known protected species (additive impacts); cultural heritage – impacts on archaeological resource (additive impacts); geology and soils – loss of agricultural soils (additive impacts); landscape and visual – changes to landscape character (in-combination impacts); materials and waste – demand (additive impacts); noise and vibration – RFFP residents as receptors (additive impacts); population and human health – new receptors and demand on existing facilities and services (in-combination impacts); road drainage and water environment – interaction with watercourses (in-combination impacts). The scale of the interactions noted has resulted in a more detailed consideration of the implications of the potential cumulative impacts identified. This is provided in a narrative that follows this table.									
21/00872/REM Phase 1 land at Old Gloucester Road, Cheltenham, Gloucestershire Cheltenham Local Plan Allocation Site HD8 – land to the north of B4634 Gloucester Road Various successive applications for approval of reserved matters (access, appearance, landscaping, layout and scale) pursuant to outline planning permissions ref. 17/01411/OUT for residential development of up to 90 dwellings, associated open space, landscaping and infrastructure, including new vehicular access to	Yes	Yes	-	-	Yes	Yes	-	Yes	Yes	Yes
	Residual inter-project cumulative effects									
	A number of topic assessments indicate the potential for the RFFP to influence the Scheme in relation to potential interactions, as follows. Air quality – increased trip generation (additive impacts); biodiversity – loss of habitat of known protected species (additive impacts); geology and soils – loss of agricultural soils (additive impacts); landscape and visual – changes to landscape character (in-combination impacts); noise and vibration – construction activities and increased trip generation (additive impacts); population and human health – new receptors, changes to existing community receptors and demand on existing facilities and services (in-combination impacts); road drainage and water environment – interaction with watercourses (flow and contamination changes) (in-combination impacts). The Scheme is noted to have the potential to exert an impact on the RFFP in relation to several topics. Principal interactions noted are as follows:									

[8] Gloucester, Cheltenham and Tewkesbury

Development	Air Quality	Biodiversity	Cultural Heritage	Climate	Geology and Soils	Landscape and Visual	Materials and Waste	Noise and Vibration	Population and Human Health	Road Drainage and Water Environment
Old Gloucester Road (revised application following grant of 20/00272/REM). The revised proposals are for 85 dwellings. This application relates to a parcel of land within HD8 – Strategic Site – land to the north of the B4634 Gloucester Road, which is a Cheltenham Plan site allocation for 175 homes (11.3 ha.)	biodiversity – loss of habitat of known protected species (additive impacts); geology and soils – loss of agricultural soils and cultivated land and possibly pollutant mobilisation (additive impacts); landscape and visual – changes to landscape character (in-combination impacts); population and human health – new receptors and demand on existing facilities and services (in-combination impacts); road drainage and water environment – interaction with watercourses (in-combination impacts). The scale of the interactions noted has resulted in a more detailed consideration of the implications of the potential cumulative impacts identified. This is provided in a narrative that follows this table.									

15.10.4. There are five strategic development sites within the RFFP shortlist that have been subject to a more detailed evaluation of the implications of the cumulative impacts identified, as potentially significant cumulative effects are predicted. These comprise the following:

- 16/02000/OUT (Elms Park) – relating to land allocated under Policy A4 – North West Cheltenham Development Area.
- 20/00759/FUL (Swindon Farm) – relating to part of the land allocated under Policy A4 – North West Cheltenham Development Area)
- Safeguarded land to the north-west of Cheltenham (Policy SD5).
- 22/01817/OUT and 22/01107/OUT – relating to part of the land allocated under Policy A7 – West Cheltenham Development Area.
- 21/00872/REM – relating to part of the land allocated under Cheltenham Local Plan Policy HD8 – Strategic Site – land to the north of the B4634.

15.10.5. A qualitative inter-project CEA narrative is provided for each in turn within this sub-section.

16/02000/OUT (Elms Park) relating to land allocated under Policy A4 – North West Cheltenham Development Area

15.10.6. This RFFP includes an outline planning application that relates to land within the North West Cheltenham Development Area. This is designated in Policy A4 of the JCS and forms one of three strategic development sites that the Scheme is intended to enable in terms of delivery of strategic transport infrastructure. The design of the Scheme has therefore already accounted for anticipated trip generation from the RFFP (i.e. the number of homes proposed) in traffic modelling through consideration of typical flows along the ARN for the Scheme in the future year growth scenarios. The design of the Scheme also includes vehicular access points into the development parcel within the relevant junction designs; and pedestrian and cycling crossing provision has been incorporated within the Scheme design at this junction, in anticipation of enabling WCH movement during future use of the access route by vehicles. On this basis, the Scheme has the potential to benefit the RFFP in terms of improving multi-modal access, both to support construction and once the RFFP is in operation (as reported in the Population assessment findings and noted as part of a positive health outcome, but not contributing to a cumulative effect).

15.10.7. The CEA assumptions are that because the Policy states that the development is dependent upon transport infrastructure improvements, which are proposed to be delivered by the Scheme, construction overlap may be anticipated in terms of enabling works and some infrastructure works, but that no residential receptors will be present within the RFFP until the Scheme is operational. On this basis, the CEA assumes that there is no potential for the Scheme construction works to affect prospective residents of this RFFP (it is important to note that application 20/00759/FUL also relates to land within the North West Cheltenham Development Area – this is further progressed through the planning system and different assumptions apply – see relevant section below).

15.10.8. The interaction of Scheme construction with enabling works and initial infrastructure development at the RFFP has the potential to generate additive cumulative effects for a number of topics:

- Air quality – increased trip generation, potentially increasing construction traffic derived pollutant exposure for residents of Uckington, which could also combine with additional point sources for construction dust to the north and west of Uckington, affecting the same group of residents and potentially, ecological receptors.
- Biodiversity – loss of habitat of known protected species, with dormouse, bats and barn owl all present (amongst others) within the Order limits and RFFP site (additive impacts on protected species).
- Cultural heritage – impacts on the setting of a Scheduled Monument at Moat House (i.e. further adding to the transition of the area to a focus for large-scale construction activities) and archaeological resource (additive impacts from ground disturbance).
- Geology and soils – loss of agricultural soils (additive impacts).
- Landscape and visual – changes to landscape character, accelerating the transition

of the rural landscape to a suburban environment. This could affect residents of Uckington most acutely, but also residential receptors within the wider visual envelope of the Scheme to the north and east of Uckington.

- Materials and waste – demand for materials (additive impacts).
- Noise and vibration – increased generation of noise and potentially vibration from construction activities, particularly affecting residents of Uckington; and increased trip generation, increasing exposure to construction traffic noise for the same residents.
- Population and human health – generation of additive cumulative adverse effects upon nearby residential receptors. This is most likely to be relevant to residents of Uckington and Homecroft Drive and is anticipated to manifest as disruptions to access and reductions in amenity. Disruptions to access at Gallagher Retail Park may also be exacerbated by works to the Gallagher Park junction and Manor Road junction due to the Scheme and RFFP combined, resulting in an additional receptor cluster – business and community facilities at Gallagher Retail Park and their user groups – also experiencing additive adverse cumulative effects
- Road drainage and water environment – interaction with Leigh Brook, which could manifest as changes to flow rates and paths and increased additive contamination risks.

15.10.9. Beneficial multi-modal transport impacts of the operational Scheme on prospective residents of the RFFP would be comparable to the general conclusions drawn in relation to residents of north-west Cheltenham (as reported in the Population assessment findings and noted as part of a positive health outcome, but not contributing to a cumulative effect). It is also important to reiterate that the CEA assumptions mean the Scheme would be operational prior to people moving into the homes proposed within the RFFP. The potential for the RFFP to interact with the Scheme to generate further cumulative effects in the Scheme operational phase are as follows:

- Air quality – the incoming residents will be exposed to traffic derived pollutants from both the A4019 and traffic movements within the new development.
- Biodiversity – the protected species present in the area would be forced to adapt to substantial changes in the habitat, noting that both the Scheme and RFFP are governed by the same environmental legislation to mitigate adverse effects. It is important to note that as an adaptation of an existing linear transport network in this part of the study area, the contribution of the Scheme to this impact is less than that of the RFFP, should it be realised. Furthermore, the Scheme environmental design has been developed to be compatible with the publicly available masterplan for the 16/0200/OUT planning application and the onus must be on the developer of that Scheme to respond to the Scheme in developing the design.
- Cultural heritage – the RFFP and Scheme together will contribute to built development being closer to and more prominent within the setting of the SM. Archaeological resources are likely to be disturbed by construction works across a wide area, noting that both the Scheme and RFFP are governed by the same legislation relating to the treatment and recording of archaeological finds.
- Landscape and visual – the RFFP and Scheme together will contribute to the transformation of a predominantly rural agricultural landscape into an area of suburban character, much more closely aligned to Cheltenham in terms of built form. Overall tree and shrub cover is likely to be substantially reduced. This will affect residents of Uckington and smaller settlements to the north and east, as well as recreational users of this part of the study area. It is important to note that as an adaptation of an existing linear transport feature, the contribution of the Scheme to this change is far less than that of the RFFP, with the latter dominating (should it be realised).

15.10.10. It is acknowledged that the developers of the RFFP will be required to adhere to environmental legislation that is intended to ensure that single project impacts do not manifest as significant adverse effects – it is assumed that this will be addressed by the developers.

Assessment of inter-project cumulative effects

15.10.11. The CEA reports on a precautionary worst case scenario. The Scheme design and environmental design have been developed to be compatible with the publicly available masterplan associated with planning application 16/02000/OUT. Notwithstanding this, in this instance, there is considerable uncertainty about the detailed design elements that may be developed within the RFFP and although it is assumed that the proposals will be taken forward in line with the outline masterplan, this may not be the case and this uncertainty is taken into account in the CEA.

15.10.12. The additive cumulative inter-project effects of the RFFP with the Scheme that are considered to have the potential to be significant, allowing for the previous assumptions – are associated with the following impacts and receptors:

- Net loss of habitat supporting protected species and interruption of established ecosystems.
- Transformation of the landscape character of Uckington and its immediate locality from a rural agricultural landscape to a suburban area connected to Cheltenham (noting that this impact is dominated by the RFFP rather than the Scheme). This is also associated with an exacerbation of negative health outcomes for existing residents, linked to anxiety, disruption, stress, loss of key characteristics of the settlement and difficulties in adapting to change.

Habitat loss

15.10.13. The habitat loss associated with the Scheme will be realised early within the construction phase and replacement planting is designed to deliver replacement habitat, as early as practicable within the construction phasing. The cumulative impact of habitat loss from site clearance and preparatory works due to the RFFP to the north of the A4019 happening concurrently, and then enduring during the early opening years of the Scheme, could extend the geographical area within which habitat of protected species is lost. This could affect the nesting and foraging habitats of bats and barn owls, amongst other protected species, across the fields to the north of the A4019. The species would be forced to adapt and potentially relocate in order to find suitable supportive habitats and these impacts would need to be mitigated within the RFFP detailed design in accordance with relevant environmental legislation relating to protected species.

15.10.14. The Scheme will provide suitable replacement habitat within the linear corridor alongside the A4019, however, there will be a need for this to continue to offer opportunities to connect with habitat through the RFFP site.

15.10.15. A precautionary worst case has to be considered for the purposes of the CEA. In terms of the inter-project cumulative effects with the Scheme, the embedded mitigation, particularly relating to the Environmental Management Plan (EMP), as well as environmental design targeting protected species along the A4019 corridor are taken into account in the CEA. The CEA also reflects the uncertainty surrounding the implementation of the RFFP. The CEA predicts a **minor to moderate adverse inter-project cumulative additive effects on the availability and continuity of habitat suitable to support protected species** in the construction phase, due to site clearance works for the RFFP occurring concurrently with Scheme construction. **This would be significant.**

Uckington residents

15.10.16. The Scheme requires the demolition of some properties at Uckington and the replacement of a priority junction to the A4019 with a fully signalised multi-lane junction and adjacent access roads to remaining properties, in conjunction with a formalised WCH route alongside the A4019 to the north. This will introduce urbanising features into the currently predominantly rural setting, as reported within the Population assessment. The cumulative impact of setting changes from new built development due to the RFFP to the north and west of Uckington happening concurrently and then increasing in geographical scale during the early opening years of the Scheme, could reinforce the urbanisation of Uckington and separate existing residents from the current rural outlook to the north and west. Residents would need to adapt to the transformational change in the size and

characteristics of the newly expanded neighbourhood of which they would become part and this is expected to be associated with increased demand and incidence of movement by all modes, which will be most noticeable along the A4019 corridor and along The Green. The RFFP indicative masterplan proposes the introduction of new land use types adjacent to Uckington, including sports pitches – these would support different recreational needs and change the characteristics and incidence of traffic and noise in this community. The specific impacts of changes would need to be assessed and suitably mitigated within the RFFP detailed design, recognising the potential for changes proposed to also realise some benefits in terms of accessibility and availability of community assets and WCH opportunities; but that change in itself may also be difficult for some community members.

15.10.17. The Scheme environmental design provides suitable softening of urbanising features to the A4019 corridor, supported by embedded and topic (population and human health) essential mitigation to ensure existing Uckington residents are well informed about the Scheme and construction phases as well as offered opportunities to engage with the contractors and propose means of resolving any issues arising. There will be merit in these approaches to community engagement being supported by the RFFP developers also; however, the level of detail within the outline application does not make commitments of this type.

15.10.18. A precautionary worst case has to be considered for the purposes of the CEA. In terms of the inter-project cumulative effects with the Scheme, the environmental design and embedded mitigation, particularly relating to the PLO and CEP within the EMP, as well as targeted engagement with residents at Uckington and along the A4019 corridor are taken into account in the CEA. The CEA also reflects the uncertainty surrounding the implementation of the RFFP. The CEA predicts a **moderate to large adverse inter-project cumulative additive effect on existing residents of the community of Uckington** in the construction phase and enduring into the operational phase. This effect is due to the transformational change in the key characteristics of Uckington from residential and employment growth at North West Cheltenham Development Area, which is partly catalysed by the Scheme (but noting that the landscape impacts are dominated by the RFFP). **This would be significant.**

Assessment of residual effects

15.10.19. Essential cumulative mitigation has been identified to seek to manage these effects. This is set out as CEA2 and CEA3 in the REAC (~~application~~Application document: TR010063/~~—~~APP/~~-~~7.4) and reproduced in Table 15-7.

15.10.20. The residual CEA takes account of the Scheme design, embedded mitigation and essential mitigation for topics and cumulative effects. The conclusion is that:

- The residual inter-project cumulative construction effect on the availability of habitat suitable to support protected species in the construction phase would be **minor to moderate adverse, with moderate effects being significant**.
- The residual inter-project cumulative construction and operation effect of urbanising and transformational change on the existing residents of Uckington would be **moderate to major adverse and significant**, varying depending on the capacity of individuals to cope with the transformational change associated with the residential and employment growth within the North West Cheltenham Development Area, partly concurrent with the Scheme.

15.10.21. The proposed essential mitigation (CEA2) has the potential to reduce the magnitude of the adverse impacts on habitats contributing to the cumulative effect. Successful co-ordination of the construction techniques, works sequencing, species translocation and detailed design to ensure suitable management of construction impacts and continuity of high quality replacement habitat for protected species could reduce cumulative effects to **minor adverse and not significant**. It should also be noted that the principal determining factor will be the RFFP, since the ES concludes that the Scheme itself will not result in significant adverse effects in isolation; and the environmental design for the Scheme has been developed to be compatible with the masterplan that forms part of the 16/02000/OUT application.

15.10.22. The proposed essential mitigation (CEA3) has the potential to reduce the magnitude of the adverse impacts on existing residents of Uckington, particularly to the north of the A4019, contributing to the cumulative effect. Successful co-ordination between the Scheme developers and the RFFP developers relating to construction activities, works sequencing and approaches to community engagement and issue resolution could reduce cumulative effects to **minor adverse and not significant**. It should also be noted that the principal determining factor will be the RFFP, since the ES concludes that the Scheme itself will not result in significant adverse residual effects in isolation.

20/00759/FUL(Swindon Farm) – relating to part of the land that is allocated under Policy A4 – North West Cheltenham Development Area

15.10.23. This RFFP includes a full planning application that relates to a parcel of land within the North West Cheltenham Development Area. This is designated in Policy A4 of the JCS and forms one of three strategic development sites that the Scheme is intended to enable in terms of delivery of strategic transport infrastructure. The design of the Scheme has therefore already accounted for anticipated trip generation from the RFFP (i.e., the number of homes proposed) in traffic modelling through consideration of typical flows along the ARN for the Scheme in the future year growth scenarios. The design of the Scheme also includes a vehicular access point into the access road serving the Application Site within the junction design; and pedestrian and cycling crossing provision has been incorporated within the Scheme design at this junction, in anticipation of enabling WCH movement during future use of the access route by vehicles. On this basis, the Scheme has the potential to benefit the RFFP in terms of improving multi-modal access, both to support construction and once the RFFP is in operation (as reported in the Population assessment findings and noted as part of a positive health outcome, but not contributing to a cumulative effect).

15.10.24. The CEA assumptions are that because the Policy states that development is dependent upon transport infrastructure improvements, which are proposed to be delivered by the Scheme, construction overlap may be anticipated in terms of enabling works, some infrastructure works and some house completions. It is also noted in the assumptions for assessment that up to 25% of the homes may be occupied at the start of Scheme construction, rising to 75% of homes in occupation once the Scheme is operational. On this basis, the CEA assumes that there is potential for the Scheme construction works to affect prospective residents; however, it is considered that any prospective residents would be well informed about the nature and planned duration of construction for both the Scheme and the RFFP on choosing to take occupation and thus their sensitivity to change must be assumed to be lower than that of existing residents. No significant construction effects on Population or Human Health from the Scheme are identified in relation to incoming residents making this choice consciously and thus no cumulative effects are predicted in relation to this.

15.10.25. The interaction of Scheme construction with enabling works, infrastructure development and construction rising from 25% up to 75% of the residential capacity at the RFFP during Scheme construction has the potential to generate additive cumulative effects for a number of topics:

- Air quality – increased trip generation, potentially increasing construction traffic derived pollutant exposure for residents of Uckington and staff and users of Gallagher Retail Park, which could also combine with additional point sources for construction dust to the north and east of Uckington, affecting the same group of residents and businesses and potentially, ecological receptors.
- Biodiversity – loss of habitat of known protected species, with dormouse, bats and barn owl all present (amongst others) within the Order limits and RFFP site (additive impacts on protected species).
- Geology and soils – loss of agricultural soils (additive impacts).
- Cultural heritage – impacts on the archaeological resource (additive impacts).
- Landscape and visual – changes to landscape character, accelerating the transition of the rural landscape to a suburban environment. This could affect residents of

Uckington most acutely, but also residential receptors within the wider visual envelope of the Scheme to the north and east of Uckington.

- Materials and waste – demand for materials (additive impacts).
- Noise and vibration – increased generation of noise and potentially vibration from construction activities, particularly affecting residents of Uckington and businesses at Gallagher Retail Park; and increased trip generation, increasing exposure to construction traffic noise for the same receptors.
- Population and human health – generation of additive cumulative adverse effects upon nearby residential receptors. This is most likely to be relevant to residents of Uckington and along the A4019 east of Uckington and is anticipated to manifest as disruptions to access and reductions in amenity – this results in effects on Population, as well as contributing to negative health outcomes for existing residents. Disruptions to access at Gallagher Retail Park may also be exacerbated by works to Manor Road due to the Scheme and RFFP combined, resulting in an additional receptor cluster – business and community facilities at Gallagher Retail Park and their user groups – also experiencing additive adverse cumulative effects.
- Road drainage and water environment – interaction with Leigh Brook, which could manifest as changes to flow rates and paths and increased additive contamination risks.

15.10.26. Beneficial multi-modal transport impacts of the operational Scheme on prospective residents of the RFFP would be comparable to the general conclusions drawn in relation to residents of north-west Cheltenham (as reported in the Population assessment findings and noted as part of a positive health outcome, but not contributing to a cumulative effect). The potential for the RFFP to interact with the Scheme to generate further cumulative effects in the Scheme operational phase are as follows:

- Biodiversity – the protected species present in the area would be forced to adapt to substantial changes in the habitat, noting that both the Scheme and RFFP are governed by the same environmental legislation to mitigate adverse effects. It is important to note that as an adaptation of an existing linear transport network in this part of the study area, the contribution of the Scheme to this impact is less than that of the RFFP, should it be realised. Furthermore, the Scheme environmental design has been developed to be compatible with the proposals included in the 20/00759/FUL planning application.
- Landscape and visual – the RFFP and Scheme together will contribute to the transformation of a predominantly rural agricultural landscape into an area of suburban character, much more closely aligned to Cheltenham in terms of built form. Overall tree and shrub cover is likely to be reduced. This will affect residents of Uckington and smaller settlements to the north and east, as well as recreational users of this part of the study area. It is important to note that as an adaptation of an existing linear transport feature, the contribution of the Scheme to this change is far less than that of the RFFP, should it be realised.

15.10.27. It is acknowledged that the developers of the RFFP will be required to adhere to environmental legislation that is intended to ensure that single project impacts do not manifest as significant adverse effects – it is assumed that this will be addressed by the developers.

Assessment of inter-project cumulative effects

15.10.28. The CEA reports on a precautionary worst case scenario. The Scheme design and environmental design has been developed to be compatible with the masterplan associated with planning application 20/00759/FUL. Notwithstanding this, in this instance, there is uncertainty about the detailed design elements that may be developed within the RFFP and although it is assumed that the proposals will be taken forward in line with the masterplan, this may not be the case and this uncertainty is taken into account.

15.10.29. The additive cumulative inter-project effects of the RFFP with the Scheme that are considered to have the potential to be significant, allowing for the previous assumption – are associated with the following impacts and receptors:

- Net loss of habitat supporting protected species and interruption of established ecosystems.
- Transformation of the landscape character of Uckington and its immediate locality from a rural agricultural landscape to a suburban area connected to Cheltenham. This is also associated with an exacerbation of negative health outcomes for existing residents, linked to anxiety, disruption, stress, loss of key characteristics of the settlement and difficulties in adapting to change.

Habitat loss

15.10.30. The habitat loss associated with the Scheme will be realised early within the construction phase and replacement planting is designed to deliver replacement habitat, as early as practicable within the construction phasing. The cumulative impact of habitat loss from site clearance and preparatory works due to the RFFP to the north of the A4019 happening concurrently, and then enduring during the early opening years of the Scheme, could extend the geographical area within which habitat of protected species is lost. This could affect the nesting and foraging habitats of bats and barn owls, amongst other protected species, across the fields to the north of the A4019 and north-west of Gallagher Retail Park. The species would be forced to adapt and potentially relocate in order to find suitable supportive habitats and these impacts would need to be mitigated within the RFFP detailed design in accordance with relevant environmental legislation relating to protected species. The Scheme will provide suitable replacement habitat within the linear corridor alongside the A4019, however, there will be a need for this to continue to offer opportunities to connect with habitat connecting to and through the RFFP site.

15.10.31. A precautionary worst case has to be considered for the purposes of the CEA. In terms of the inter-project cumulative effects with the Scheme, the embedded mitigation, particularly relating to the EMP, as well as environmental design targeting protected species along the A4019 corridor are taken into account in the CEA. The CEA also reflects the uncertainty surrounding the implementation of the RFFP. The CEA predicts a **minor to moderate adverse inter-project cumulative additive effect on the availability and continuity of habitat suitable to support protected species** in the construction phase, due to site clearance works for the RFFP occurring concurrently with Scheme construction. **This would be significant.**

Uckington residents

15.10.32. The Scheme requires the demolition of some properties at Uckington and the replacement of a priority junction to the A4019 with a fully signalised multi-lane junction and adjacent access roads to remaining properties, in conjunction with a formalised WCH route alongside the A4019 to the north. This will introduce urbanising features into the currently predominantly rural setting, as reported within the Population assessment. The cumulative impact of setting changes from new built development due to the RFFP to the north and north-east of Uckington happening concurrently and then increasing in geographical scale during the early opening years of the Scheme, could reinforce the urbanisation of Uckington and connect it to the wider north-west Cheltenham residential areas. Residents would need to adapt to the change in the size and characteristics of the newly expanded neighbourhood of which they would become part and this is expected to be associated with increased demand and incidence of movement by all modes, which will be most noticeable along the A4019 corridor. The RFFP introduces residential development on existing farmland, at a higher density than the existing settlement of Uckington – this increase in local population would change the characteristics and incidence of traffic and noise in this community. The specific impacts of changes would need to be assessed and suitably mitigated within the RFFP detailed design, recognising the potential for changes proposed to also realise some benefits in terms of accessibility and availability of community assets and WCH opportunities; but that change in itself may also be difficult for some community members.

15.10.33. The Scheme environmental design provides suitable softening of urbanising features to the A4019 corridor, supported by embedded and topic (population and human health) essential mitigation to ensure existing Uckington residents are well informed about the Scheme and construction phases as well as offered opportunities to engage with the

contractors and propose means of resolving any issues arising. There will be merit in these approaches to community engagement being supported by the RFFP developers also; however, the level of detail within the RFFP planning application does not make commitments of this type.

15.10.34. A precautionary worst case has to be considered for the purposes of the CEA. In terms of the inter-project cumulative effects with the Scheme, the environmental design and embedded mitigation, particularly relating to the PLO and CEP within the EMP, as well as targeted engagement with residents at Uckington and along the A4019 corridor are taken into account in the CEA. The CEA also reflects the uncertainty surrounding the implementation of the RFFP. The CEA predicts a **moderate adverse inter-project cumulative additive effect on existing residents of the community of Uckington** in the construction phase and enduring into the operational phase. This effect is due to the change in the key characteristics of Uckington from residential development in this part of the North West Cheltenham Development Area, which is partly catalysed by the Scheme. **This would be significant.**

Assessment of residual effects

15.10.35. Essential cumulative mitigation has been identified to seek to manage these effects. This is set out as CEA2 and CEA3 in the REAC (~~application~~Application document: TR010063/~~-~~APP/~~-~~7.4) and reproduced in Table 15-7.

15.10.36. The residual CEA takes account of the Scheme design, embedded mitigation and essential mitigation for topics and cumulative effects. The conclusion is that:

- The residual inter-project cumulative construction effect on the availability of habitat suitable to support protected species in the construction phase would be minor to moderate adverse, with moderate effects being significant.
- The residual inter-project cumulative construction and operation effect of urbanising and transformational change on the existing residents of Uckington would be moderate adverse and significant, varying depending on the capacity of individuals to cope with the change associated with the residential development within this part of the North West Cheltenham Development Area, partly concurrent with the Scheme.

15.10.37. The proposed essential mitigation (CEA2) has the potential to reduce the magnitude of the adverse impacts on habitats contributing to the cumulative effect. Successful co-ordination of the construction techniques, works sequencing, species translocation and detailed design to ensure suitable management of construction impacts and continuity of high quality replacement habitat for protected species could reduce cumulative effects to **minor adverse and not significant**. It should also be noted that the principal determining factor will be the RFFP, since the ES concludes that the Scheme itself will not result in significant adverse effects in isolation; and the environmental design for the Scheme has been developed to be compatible with the masterplan that forms part of the 22/00759/FUL planning application.

15.10.38. The proposed essential mitigation (CEA3) has the potential to reduce the magnitude of the adverse impacts on existing residents of Uckington, particularly to the north of the A4019, contributing to the cumulative effect. Successful co-ordination between the Scheme developers and the RFFP developers relating to construction activities, works sequencing and approaches to community engagement and issue resolution could reduce cumulative effects to **minor adverse and not significant**. It should also be noted that the principal determining factor will be the RFFP, since the ES concludes that the Scheme itself will not result in significant adverse residual effects in isolation.

Safeguarded land to the north-west of Cheltenham (Policy SD5)

15.10.39. This RFFP relates to land safeguarded in the JCS to meet future development needs beyond the JCS period – it forms one of three strategic development locations that the Scheme is intended to enable in terms of delivery of strategic transport infrastructure. The design of the Scheme has therefore already accounted for anticipated trip generation from the RFFP (i.e. the potential level of strategic growth proposed) in traffic modelling through

consideration of typical flows along the ARN for the Scheme in the future year growth scenarios. The design of the Scheme also includes a vehicular access point into the development parcel within the junction design; and pedestrian and cycling crossing provision has been incorporated within the Scheme design at this junction, in anticipation of enabling WCH movement during future use of the access route by vehicles. On this basis, the Scheme has the potential to benefit the RFFP in terms of improving multi-modal access, both to support construction and once the RFFP is in operation (as reported in the Population assessment findings and noted as part of a positive health outcome, but not contributing to a cumulative effect).

15.10.40. The JCS Policy indicates that development in this location is dependent upon transport infrastructure improvements, which are proposed to be delivered by the Scheme. The CEA assumptions are based on there being active developer promotion of the site (through the JCS review process), and assume some construction overlap with the Scheme, although no residential receptors will be present until the Scheme is operational. On this basis, there is no potential for the Scheme construction works to affect prospective residents at this safeguarded site.

15.10.41. The informal Traveller site adjacent to the M5 is within the curtilage of the safeguarded land to the north-west of Cheltenham and it is assumed that any impacts from the RFFP will be direct land take, displacing all residents; and therefore of a greater magnitude than those that would be experienced from the Scheme. This is not reflected as a cumulative effect, but rather is considered as a direct RFFP impact that would need to be addressed by the developer of the RFFP – these residents are not treated as receptors for this displacement impact for the purposes of the CEA.

15.10.42. The interaction of Scheme construction with enabling works and initial infrastructure development at the RFFP has the potential to generate additive cumulative effects for a number of topics:

- Air quality – increased trip generation, potentially increasing construction traffic derived pollutant exposure for residents close to M5 J10, which could also combine with additional point sources for construction dust to the north and west of Uckington, affecting both groups of residents and potentially, ecological receptors.
- Biodiversity – loss of habitat of known protected species, with dormouse, bats and barn owl all present (amongst others) within the Order limits and RFFP site (additive impacts on protected species).
- Cultural heritage – impacts on archaeological resource (additive impacts from ground disturbance).
- Geology and soils – loss of agricultural soils (additive impacts).
- Landscape and visual – changes to landscape character, accelerating the transition of the rural landscape to a suburban environment. This could affect residents of Uckington and along the A4019 most acutely, but also residential receptors within the wider visual envelope of the Scheme to the north and east of Uckington, including Elmstone Hardwicke.
- Materials and waste – demand for materials (additive impacts).
- Noise and vibration – increased generation of noise and potentially vibration from construction activities, particularly affecting residents close to the M5 J10 and along the A4019 as well as Uckington; and increased trip generation, increasing exposure to construction traffic noise for the same residents.
- Population and human health – generation of additive cumulative adverse effects upon nearby residential receptors. This is most likely to be relevant to residents of Uckington and the A4019 between M5 J10 and Uckington and is anticipated to manifest as disruptions to access and reductions in amenity - this results in effects on Population, as well as contributing to negative health outcomes for existing residents.
- Road drainage and water environment – interaction with watercourses, which could manifest as changes to flow rates and paths and increased additive contamination risks.

15.10.43. Beneficial multi-modal transport impacts of the operational Scheme on prospective residents of the RFFP would be comparable to the general conclusions drawn in relation to residents of Uckington and north-west Cheltenham (as reported in the Population assessment findings and noted as part of a positive health outcome, but not contributing to a cumulative effect). It is also important to reiterate that the CEA assumptions mean the Scheme would be operational prior to people moving into the homes proposed within the RFFP. The potential for the RFFP to interact with the Scheme to generate further cumulative effects in the Scheme operational phase are as follows:

- Air quality – the incoming residents will be exposed to traffic derived pollutants from the A4019, M5 J10 and traffic movements within the new development.
- Biodiversity – the protected species present in the area would be forced to adapt to substantial changes in the habitat, noting that both the Scheme and RFFP are governed by the same environmental legislation to mitigate adverse effects. It is important to note that as an adaptation of an existing linear transport network in this part of the study area, the contribution of the Scheme to this impact is less than that of the RFFP, should it be realised. However, the Scheme environmental design includes the Withybridge (A4019) underpass, which requires continuity of habitat suitable for bats to the north of the A4019 and within the RFFP site in order to operate effectively. Hedgerow design and connectivity is also important for dormouse and other protected species. The onus must be on the developer of the RFFP to respond to the Scheme in developing the design.
- Cultural heritage – archaeological resources are likely to be disturbed by construction works across a wide area, noting that both the Scheme and RFFP are governed by the same legislation relating to the treatment and recording of archaeological finds.
- Landscape and visual – the RFFP and Scheme together will contribute to the transformation of a predominantly rural agricultural landscape into an area of suburban character, much more closely aligned to Cheltenham in terms of built form. Overall tree and shrub cover is likely to be substantially reduced. This will affect residents along the A4019, at Uckington and smaller settlements to the north and east (including Elmstone Hardwicke), as well as recreational users of this part of the study area. It is important to note that as an adaptation of an existing linear transport feature, the contribution of the Scheme to this change is far less than that of the RFFP, with the latter dominating (should it be realised).
- Population and human health – the Scheme includes an underpass beneath the A4019 to the east of M5 Junction 10. This is intended to connect to the bridleway AUC1 and wider footpath network that exists within the land to which the RFFP relates. The RFFP therefore has the potential to interact with WCH user group receptors, who themselves are anticipated to increase in number once the Scheme is operational due to the enhanced connectivity of recreational routes in this location. This represents a potential cumulative inter-project effect – dependent upon the RFFP design and proposals for managing construction (which are not currently known), the resultant effects of this interaction could be beneficial or adverse.

15.10.44. It is acknowledged that the developers of the RFFP will be required to adhere to environmental legislation that is intended to ensure that single project impacts do not manifest as significant adverse effects – it is assumed that this will be addressed by the developers.

Assessment of inter-project cumulative effects

15.10.45. The CEA reports on a precautionary worst case scenario. The Scheme design and environmental design has been developed to be compatible with the prospect of future built development within the RFFP site, which is safeguarded for development containing around 2,000 homes and an element of mixed use development. Uncertainty in how the RFFP will be developed has been taken into account in the assessment made in the CEA for the Scheme.

15.10.46. The additive cumulative inter-project effects of the RFFP with the Scheme that are considered to have the potential to be significant, allowing for the previous assumption – are associated with the following impacts and receptors:

- Net loss of habitat supporting protected species and interruption of established ecosystems. Also risks to the efficacy of Scheme mitigation for bats, dormouse and other protected species, depending on how the RFFP is developed.
- Transformation of the landscape character from a rural agricultural landscape to a suburban area connected to Cheltenham. This is also associated with an exacerbation of negative health outcomes for existing residents.
- Re-configuration of established recreational network within this part of the study area. Also risks to the integrity of WCH proposals within the Scheme, depending on how the RFFP is developed.

Habitat loss

15.10.47. The habitat loss associated with the Scheme will be realised early within the construction phase and the Withybridge (A4019) underpass and habitats at the tunnel mouths are designed to deliver connectivity and access to replacement and more biodiverse habitat to the south of the A4019, as early as practicable within the construction phasing. The cumulative impact of habitat loss from site clearance and preparatory works due to the RFFP to the north of the A4019 happening concurrently, and then enduring during the early opening years of the Scheme, could extend the geographical area within which habitat of protected species is lost. This could affect the nesting and foraging habitats of bats and barn owls, amongst other protected species, across the fields to the north of the A4019, as well as potentially compromising the effectiveness of the Withybridge (A4019) underpass as a wildlife crossing, suitable for bats and other protected species. The species would be forced to adapt and potentially relocate in order to find suitable supportive habitats and these impacts would need to be mitigated within the RFFP detailed design in accordance with relevant environmental legislation relating to protected species. The Scheme will provide suitable replacement habitat within the linear corridor alongside the A4019, in addition to the crossing beneath the road. However, there will be a need for this to continue to offer opportunities to connect with habitat through the RFFP site.

15.10.48. A precautionary worst case has to be considered for the purposes of the CEA. In terms of the inter-project cumulative effects with the Scheme, the embedded mitigation, particularly relating to the EMP, as well as environmental design of hedgerows and the delivery of the Withybridge (A4019) underpass and targeting protected species along the A4019 corridor are taken into account in the CEA. The CEA also reflects the uncertainty surrounding the implementation of the RFFP. The CEA predicts a **moderate to major adverse inter-project cumulative additive effect on the availability and continuity of habitat suitable to support protected species** in the construction phase, due to site clearance works for the RFFP occurring concurrently with Scheme construction. **This would be significant.**

Existing residents

15.10.49. The Scheme requires the demolition of some properties at Withybridge Lane, along the A4019 and at Uckington, Existing junctions to the A4019 will be replaced by a combination of fully signalised multi-lane junctions and, in places, adjacent access roads to remaining properties, in conjunction with a formalised WCH route alongside the A4019 to the north. This will introduce urbanising features into the currently predominantly rural setting, as reported within the Population assessment.

15.10.50. The cumulative impact of setting changes from the Scheme and new built development due to the RFFP, particularly for residents north of the A4019 and at Uckington, happening concurrently and then increasing in geographical scale during the early opening years of the Scheme, could reinforce the urbanisation of this location. Together, they would essentially extend the outer limits of Cheltenham's western edge as well as separating existing residents from the current rural outlook to the north of the A4019. Residents would need to adapt to the transformational change in the size and characteristics of the newly expanded neighbourhood of which they would become part and this is expected to be associated with increased demand and incidence of movement by all modes, which will be most noticeable along the A4019 corridor and along The Green (Uckington). The CEA

assumptions are that the RFFP could deliver around 2,000 homes and an element of mixed use development. The expanded population would support different recreational needs and change the characteristics and incidence of traffic and noise in the existing residential community. The specific impacts of changes would need to be assessed and suitably mitigated within the RFFP detailed design. This process would need to recognise the potential for changes proposed to also realise some benefits in terms of accessibility and availability of community assets and WCH opportunities; but that change in itself may also be difficult for some community members.

15.10.51. The Scheme environmental design provides suitable softening of urbanising features to the A4019 corridor, supported by embedded and topic (population and human health) essential mitigation to ensure existing residents along the A4019 and at Uckington are well informed about the Scheme and construction phases as well as offered opportunities to engage with the contractors and propose means of resolving any issues arising. There will be merit in these approaches to community engagement being supported by the RFFP developers also; however, such commitments have not yet been made.

15.10.52. A precautionary worst case has to be considered for the purposes of the CEA. In terms of the inter-project cumulative effects with the Scheme, the environmental design and embedded mitigation, particularly relating to the PLO and CEP within the EMP, as well as targeted engagement with residents at Uckington and along the A4019 corridor are taken into account in the CEA. The CEA also reflects the uncertainty surrounding the implementation of the RFFP. The CEA predicts a **moderate to large adverse inter-project cumulative additive effect on existing residents of the community of Uckington and north of the A4019** in the construction phase and enduring into the operational phase. This effect is due to the transformational change in the key characteristics of this location from residential and employment growth at safeguarded land to the north-west of Cheltenham, which is partly catalysed by the Scheme. **This would be significant.**

WCH users

15.10.53. The Scheme introduces a new bridleway connection that will cross beneath the A4019 via the Withybridge (A4019), enhancing user safety and journey time by removing the conflict with vehicles. This route connects to AUC1 and the wider footpath network, including routes that extend to the north of the A4019, through the RFFP. The cumulative impact on the WCH network of the Scheme and new development due to the RFFP will depend on the way in which the developer carries forward proposals within the development site – there are opportunities to reinforce benefits to the WCH network by maintaining continuity and introducing further connections. However, there is also the risk that the change from agricultural land to built development will detract from the recreational value and/or amenity for WCH, particularly for equestrians since horses have greater sensitivity or can behave unpredictably in a more urban context. This will be most marked once the Scheme infrastructure is operational, but construction works at the RFFP are ongoing. Depending on the RFFP design and construction phasing, the effectiveness of the Scheme WCH element in this location could be compromised, through disruption or temporary closures. The specific impacts of changes would need to be assessed and suitably mitigated within the RFFP detailed design. This process would need to recognise the potential for changes proposed to also realise some benefits in terms of accessibility and connectivity of WCH opportunities; but that change in itself may also be difficult for some WCH users to adapt to.

15.10.54. A precautionary worst case has to be considered for the purposes of the CEA. In terms of the inter-project cumulative effects with the Scheme, the environmental design and embedded mitigation, particularly relating to delivery of the Withybridge (A4019) underpass and additional bridleway connections into and through it from the south with maintenance secured within the REAC (~~application~~Application document: TR010063/~~–~~APP/~~–~~7.4), are taken into account in the CEA. The CEA also reflects the uncertainty surrounding the implementation of the RFFP. The CEA predicts a **minor to moderate adverse inter-project cumulative additive effect on WCH users of the recreational network close to M5 Junction 10** in the construction phase and enduring into the operational phase. This effect is due to the changes in the configuration, availability,

amenity and wider connectivity of WCH routes in this location from residential and employment growth at safeguarded land to the north-west of Cheltenham, which is partly catalysed by the Scheme. **This would be significant.**

Assessment of residual effects

15.10.55. Essential cumulative mitigation has been identified to seek to manage these effects. This is set out as CEA2 and CEA3 in the REAC (~~application~~Application document: TR010063/~~—~~APP/-7.4) and reproduced in Table 15-7.

15.10.56. The residual CEA takes account of the Scheme design, embedded mitigation and essential mitigation for topics and cumulative effects. The conclusion is that:

- The residual inter-project cumulative construction effect on the availability and continuity of habitat suitable to support protected species in the construction phase would be moderate adverse and significant.
- The residual inter-project cumulative construction and operation effect of urbanising and transformational change on the existing residents of the community of Uckington and north of the A4019 would be moderate to major adverse and significant, varying depending on the capacity of individuals to cope with the transformational change associated with the residential and employment growth within the safeguarded land to the north-west of Cheltenham, partly concurrent with the Scheme.
- The residual inter-project cumulative construction and operation effect of changes to the configuration, availability, amenity and wider connectivity of the WCH network on WCH users of the recreational network close to M5 Junction would be minor to moderate adverse, with moderate effects being significant. The variation will depend on the sensitivity of the user and the purpose of their journeys. The moderate adverse effect is most likely for horses and their riders, and those seeking a rural outlook for recreation, but may also be experienced by other users, depending on the capacity of individuals to adapt to change.

15.10.57. The proposed essential mitigation (CEA2) has the potential to reduce the magnitude of the adverse impacts on habitats contributing to the cumulative effect. Successful co-ordination of the construction techniques, works sequencing and detailed design to ensure suitable management of construction impacts and continuity of high quality replacement habitat for protected species could reduce cumulative effects to **minor adverse and not significant**. This will be particularly important at the northern approach to the Withybridge (A4019) underpass and in the form and continuity of hedgerow planting. It should also be noted that the principal determining factor will be the RFFP, since the ES concludes that the Scheme itself will not result in significant adverse effects in isolation; and the environmental design for the Scheme has been developed to be compatible with the future uses of the RFFP.

15.10.58. The proposed essential mitigation (CEA2) has the potential to reduce the magnitude of the adverse impacts on amenity for WCH users and presents opportunities to realise benefits for the configuration, availability and wider connectivity of the recreational network for existing and prospective WCH users. Successful co-ordination of construction proposals and works sequencing could avoid or minimise disruption to sections of the WCH network and adverse effects on amenity for users. Residual inter-project cumulative adverse effects on amenity for WCH users could therefore reduce to **minor adverse and not significant**. Co-ordinated development of masterplan proposals for the RFFP could extend the WCH network and enhance connectivity of routes, providing links to existing and potential new destinations – it is this approach that might deliver benefits in the longer term – residual inter-project cumulative effects on configuration, availability and wider connectivity of WCH networks could become **minor to moderate beneficial and the latter would be significant**. It should also be noted that the principal determining factor will be the RFFP, since the ES concludes that the Scheme itself will not result in significant adverse effects in isolation.

15.10.59. The proposed essential mitigation (CEA3) has the potential to reduce the magnitude of the adverse impacts on existing residents of Uckington and alongside the A4019, particularly to the north of the A4019, contributing to the cumulative effect from

transformational change. Successful co-ordination between the Scheme developers and the RFFP developers relating to construction activities, works sequencing and approaches to community engagement and issue resolution could reduce cumulative effects to **minor adverse and not significant**. It should also be noted that the principal determining factor will be the RFFP, since the ES concludes that the Scheme itself will not result in significant adverse residual effects in isolation.

22/01817/OUT and 22/01107/OUT – relating to part of the land allocated under Policy A7 – West Cheltenham Development Area

15.10.60. This RFFP includes an outline planning application that relates to land within the West Cheltenham Development Area. This is designated in Policy A7 of the JCS and forms one of three strategic development sites that the Scheme is intended to enable in terms of delivery of strategic transport infrastructure. The design of the Scheme has therefore already accounted for anticipated trip generation from the RFFP (i.e. the number of homes proposed) in traffic modelling through consideration of typical flows along the ARN for the Scheme in the future year growth scenarios. The design of the Scheme also includes a vehicular access point into the access road serving the development parcel within the junction design on the B4634; and pedestrian and cycling crossing provision has been incorporated within the Scheme design at this junction, in anticipation of enabling WCH movement during future use of the access route by vehicles. On this basis, the Scheme has the potential to benefit the RFFP in terms of improving multi-modal access, both to support construction and once the RFFP is in operation (as reported in the Population assessment findings and noted as part of a positive health outcome, but not contributing to a cumulative effect).

15.10.61. The CEA assumptions are that because the Policy states that the development is dependent upon transport infrastructure improvements, which are proposed to be delivered by the Scheme, construction overlap may be anticipated in terms of enabling works and some infrastructure works, but that no residential receptors will be present until the Scheme is operational[9]. On this basis, the CEA assumes that there is no potential for the Scheme construction works to affect prospective residents.

15.10.62. The interaction of Scheme construction with enabling works and initial infrastructure development at the RFFP has the potential to generate additive cumulative effects for a number of topics:

- Air quality – increased trip generation, potentially increasing construction traffic derived pollutant exposure for residents of Withybridge Lane and the B4634 close to the proposed Link Road junction, which could also combine with additional point sources for construction dust to the south of the Order limits, affecting the same group of residents and potentially, ecological receptors.
- Biodiversity – loss of habitat of known protected species, with bats and barn owl present (amongst others) within the Order limits and RFFP site (additive impacts on protected species).
- Cultural heritage – impacts on the archaeological resource (additive impacts from ground disturbance).
- Geology and soils – loss of agricultural soils (additive impacts).
- Landscape and visual – changes to landscape character, accelerating the transition of the rural landscape to a suburban environment. This could affect residents on the B4634 most acutely, but also residential receptors within the wider visual envelope of the Scheme along Withybridge Lane and to the south of the Order limits.

[9] It is acknowledged that this is at variance with the proposed phasing within the application documents, which indicate an aspiration to commence delivery of up to 600 ~~dwellings~~ residential properties in the north-eastern part of the application site by using a secondary access to the B4634 in advance of delivery of the 'main' access by the Scheme. The CEA assumption reflects the early stage of the RFFP within the planning system – the outline application was registered in early October 2022, with supplementary materials registered in December 2022 and the precedent from the 16/02000/OUT application suggests that the determination period could extend considerably beyond statutory timescales. In addition, reserved matters applications would be required to be approved and pre-commencement conditions discharged before work could commence on site.

- Materials and waste – demand for materials (additive impacts).
- Noise and vibration – increased generation of noise and potentially vibration from construction activities, particularly affecting residents and businesses on the B4634 and also residential receptors along Withybridge Lane and to the south of the Order limits; and increased trip generation, increasing exposure to construction traffic noise for the same residents.
- Population and human health – generation of additive cumulative adverse effects upon nearby residential receptors. This is most likely to be relevant to residents along the B4634 close to the proposed Link Road junction, as well as staff and users of the House in the Tree Public House and is anticipated to manifest as disruptions to access and reductions in amenity – this results in effects on Population, as well as contributing to negative health outcomes for existing residents.
- Road drainage and water environment – interaction with watercourses, which could manifest as changes to flow rates and paths and increased additive contamination risks.

15.10.63. Beneficial multi-modal transport impacts of the operational Scheme on prospective residents of the RFFP would be comparable to the general conclusions drawn in relation to residents of north-west Cheltenham (as reported in the Population assessment findings and noted as part of a positive health outcome, but not contributing to a cumulative effect), also noting potential access routes that would be created to the south. It is also important to reiterate that the CEA assumptions mean the Scheme would be operational prior to people moving into the homes proposed within the RFFP. The potential for the RFFP to interact with the Scheme to generate further cumulative effects in the Scheme operational phase are as follows:

- Biodiversity – the protected species present in the area would be forced to adapt to substantial changes in the habitat, noting that both the Scheme and RFFP are governed by the same environmental legislation to mitigate adverse effects. It is important to note that as an insertion of a new section of linear transport network to the north-west of the RFFP, the contribution of the Scheme to this impact is less than that of the RFFP, should it be realised. Furthermore, the Scheme environmental design has been reviewed against the illustrative masterplan within the 22/01817/OUT and 22/01107/OUT application and is considered compatible and the onus must be on the developer of the RFFP to respond to the Scheme in developing the design.
- Cultural heritage – archaeological resources are likely to be disturbed by construction works across a wide area, noting that both the Scheme and RFFP are governed by the same legislation relating to the treatment and recording of archaeological finds. At 64 hectares in size, the contribution of the RFFP to disturbance of archaeological resources will be more than that of the linear Link Road proposals and B4634 junction proposed within the Scheme.
- Landscape and visual – the RFFP and Scheme together will contribute to the transformation of a predominantly rural agricultural landscape into an area of suburban character, much more closely aligned to Cheltenham and the business development that includes the Cyber park in terms of built form. Overall tree and shrub cover is likely to be substantially reduced. This will affect residents of the B4634 and Withybridge Lane, as well as recreational users of this part of the study area. It is important to note that as a linear transport proposal, the contribution of the Scheme to this change is far less than that of the RFFP, should it be realised.

15.10.64. It is acknowledged that the developers of the RFFP will be required to adhere to environmental legislation that is intended to ensure that single project impacts do not manifest as significant adverse effects – it is assumed that this will be addressed by the developers.

Assessment of inter-project cumulative effects

15.10.65. The CEA reports on a precautionary worst case scenario. The Scheme design and environmental design has been reviewed against the illustrative masterplan for the RFFP

and is considered compatible. Notwithstanding this, in this instance, there is considerable uncertainty about the detailed design elements that may be developed within the RFFP and although it is assumed that the proposals will be taken forward in line with the outline masterplan, this may not be the case and this uncertainty is taken into account.

15.10.66. The additive cumulative inter-project effects of the RFFP with the Scheme that are considered to have the potential to be significant, allowing for the previous assumption – are associated with the following impacts and receptors:

- Net loss of habitat supporting protected species and interruption of established ecosystems.
- Transformation of the landscape character around the B4634 and Withybridge Lane and extending southwards, from a rural agricultural landscape to a suburban area connected to Cheltenham and crossed by additional strategic transport infrastructure. This is also associated with an exacerbation of negative health outcomes for existing residents, linked to anxiety, disruption, stress, loss of key characteristics of residential setting and difficulties in adapting to change.

Habitat loss

15.10.67. The habitat loss associated with the Scheme will be realised early within the construction phase and replacement planting is designed to deliver replacement habitat along and crossing the Link Road corridor and around the B4634/Link Road junction, as early as practicable within the construction phasing. The cumulative impact of habitat loss from site clearance and preparatory works due to the RFFP to the south of the B4634 happening concurrently, and then enduring during the early opening years of the Scheme, could extend the geographical area within which habitat of protected species is lost. This could affect the nesting and foraging habitats of bats and barn owls, amongst other protected species, across the fields crossed by the Link Road and to the south of the B4634. The species would be forced to adapt and potentially relocate in order to find suitable supportive habitats and these impacts would need to be mitigated within the RFFP detailed design in accordance with relevant environmental legislation relating to protected species. The Scheme will provide suitable replacement habitat within the linear corridor alongside the Link Road and B4634, including targeted species crossing provision at certain locations beneath the Link Road, however, there will be a need for connections to be maintained through green infrastructure within the RFFP site.

15.10.68. A precautionary worst case has to be considered for the purposes of the CEA. In terms of the inter-project cumulative effects with the Scheme, the embedded mitigation, particularly relating to the EMP, as well as environmental design targeting protected species along the Link Road corridor are taken into account in the CEA. The CEA also reflects the uncertainty surrounding the implementation of the RFFP. The CEA predicts a **minor to moderate adverse inter-project cumulative additive effect on the availability and continuity of habitat suitable to support protected species** in the construction phase, due to site clearance works for the RFFP occurring concurrently with Scheme construction. **The moderate effects would be significant.**

Existing residents (B4634 and Withybridge Lane)

15.10.69. The Scheme requires the demolition of some properties at Withybridge Gardens (at the northern end of Withybridge Lane) and the introduction of a new linear transport corridor in the form of the Link Road to connect the A4019 to the B4634, which will bisect this predominantly agricultural landscape. This will introduce urbanising features into the currently predominantly rural setting, as reported within the Population assessment. The cumulative impact of setting changes from new built development due to the RFFP to the south and south-east of existing residents happening concurrently and then increasing in geographical scale during the early opening years of the Scheme, could reinforce the urbanisation of this part of the study area and diminish the current rural outlook to the east (Withybridge Lane) and south (B4634 residents). Residents would need to adapt to the transformational change in the size and characteristics of the newly expanded neighbourhood of which they would become part and this is expected to be associated

with increased demand and incidence of movement by all modes, which will be most noticeable along the Link Road.

15.10.70. The RFFP illustrative masterplan proposes the introduction of new land use types including a new community hub, with workspace and convenience retail as well as land earmarked for primary school provision. These land use changes, together with the residential development (1,100 homes proposed) would promote different daily movement patterns, support different recreational needs and change the characteristics and incidence of traffic and noise in this community. The specific impacts of changes would need to be assessed and suitably mitigated within the RFFP detailed design, recognising the potential for changes proposed to also realise some benefits in terms of accessibility and availability of community assets and WCH opportunities; but that change in itself may also be difficult for some community members.

15.10.71. The Scheme environmental design provides suitable softening of urbanising features to the Link Road corridor, supported by embedded and topic (population and human health) essential mitigation, to ensure residents are well informed about the Scheme and construction phases as well as offered opportunities to engage with the contractors and propose means of resolving any issues arising. There will be merit in these approaches to community engagement being supported by the RFFP developers also; however, the level of detail within the outline application does not make commitments of this type.

15.10.72. A precautionary worst case has to be considered for the purposes of the CEA. In terms of the inter-project cumulative effects with the Scheme, the environmental design and embedded mitigation, particularly relating to the PLO and CEP within the EMP, as well as targeted engagement with residents are taken into account in the CEA. The CEA also reflects the uncertainty surrounding the implementation of the RFFP. The CEA predicts a **moderate inter-project cumulative additive effect** on existing residents of the B4634 and Withybridge Lane in the construction phase and enduring into the operational phase. This effect is due to the change in the key characteristics of the area due to residential, community and employment growth at the West Cheltenham Development Area, which is partly catalysed by the Scheme. **This would be significant.**

Assessment of residual effects

15.10.73. Essential cumulative mitigation has been identified to seek to manage these effects. This is set out as CEA2 and CEA3 in the REAC (~~application~~Application document: TR010063/~~-~~APP/~~-~~7.4) and reproduced in Table 15-7.

15.10.74. The residual CEA takes account of the Scheme design, embedded mitigation and essential mitigation for topics and cumulative effects. The conclusion is that:

- The residual inter-project cumulative construction effect on the availability of habitat suitable to support protected species in the construction phase would be **minor to moderate adverse, with moderate effects being significant.**
- The residual inter-project cumulative construction and operation effect on the existing residents of the B4634 and Withybridge Lane would **be moderate adverse and significant**, varying depending on the capacity of individuals to cope with the transformational change associated with the residential and employment growth within the West Cheltenham Development Area, partly concurrent with and enabled by the Scheme.

15.10.75. The proposed essential mitigation (CEA2) has the potential to reduce the magnitude of the adverse impacts on habitats contributing to the cumulative effect. Successful co-ordination of the construction techniques, works sequencing, species translocation and detailed design to ensure suitable management of construction impacts and continuity of high quality replacement habitat for protected species could reduce cumulative effects to **minor adverse and not significant**. It should also be noted that the principal determining factor will be the RFFP, since the ES concludes that the Scheme itself will not result in significant adverse effects in isolation; and the environmental design for the Scheme has been reviewed against the illustrative masterplan for 22/01817/OUT and 22/01107/OUT and is considered compatible.

15.10.76. The proposed essential mitigation (CEA3) has the potential to reduce the magnitude of the adverse impacts on existing residents of the B4634 and Withybridge Lane, contributing to the cumulative effect. Successful co-ordination between the Scheme developers and the RFFP developers relating to construction activities, works sequencing and approaches to community engagement and issue resolution could reduce cumulative effects to **minor adverse and not significant**. It should also be noted that the principal determining factor will be the RFFP, since the ES concludes that the Scheme itself will not result in significant adverse residual effects in isolation.

21/00872/REM – relating to part of the land allocated under Cheltenham Local Plan Policy HD8 – Strategic Site – land to the north of the B4634

15.10.77. This RFFP relates to the south-western portion of a larger site allocated under Policy HD8 for residential led development within the adopted Cheltenham Plan. The level of growth proposed in the Plan would have been evaluated by the CBC planning policy officers during the Plan preparation in the context that the JCS proposed the Scheme to enhance the strategic transport network in the vicinity of the RFFP. On this basis, the Scheme has the potential to benefit the RFFP in terms of improving multi-modal access in this part of Cheltenham, both to support construction and once the RFFP is in operation (as reported in the Population assessment findings and noted as part of a positive health outcome, but not contributing to a cumulative effect).

15.10.78. The CEA assumptions are that because the RFFP is associated with successive applications for discharging conditions, and there is a two year expiration on the principal consent, construction overlap may be anticipated in relation to this RFFP and the Scheme. It is assumed that enabling works and some infrastructure works will be underway at the time of Scheme construction commencement, with 50% of the RFFP built out during the Scheme construction phase – this equates to 43 units. On this basis, the CEA assumes that there is potential for the Scheme construction works to affect prospective residents. However, it is considered that such persons would be well informed about the nature and planned duration of construction for the Scheme and the RFFP, as well as the prospect of future development on the remaining parcel of land allocated in Policy HD8 on choosing to take occupation and thus their sensitivity to change must be assumed lower than that of existing residents of the study area. No significant construction effects on Population and Human Health from the Scheme are identified in relation to incoming residents making this choice consciously and thus no cumulative effects are predicted in relation to this.

15.10.79. The interaction of the Scheme construction with enabling works, infrastructure development and construction of up to 50% of the residential capacity at the RFFP has the potential to generate additive cumulative effects for a number of topics:

- Air quality – increased trip generation, potentially increasing construction traffic derived pollutant exposure for residents of this part of the study area, albeit noting that the section of the B4634 closest to the RFFP is not associated with Scheme construction traffic.
- Biodiversity – loss of habitat of known protected species, with bats and barn owl all present (amongst others) within the Order limits and RFFP site (additive impacts on protected species).
- Geology and soils – potential loss of agricultural soils (additive impacts).
- Landscape and visual – changes to landscape character, accelerating the transition of the rural landscape to a suburban environment. This could affect residents along the B4634 most acutely, but also residential receptors within the wider visual envelope of the Scheme on the western edges of Cheltenham.
- Noise and vibration – increased generation of noise and potentially vibration from construction activities, particularly affecting residents of this part of the study area and potentially some on the southern side of the A4019; and increased trip generation, increasing exposure to construction related noise for the same receptors.
- Population and human health – generation of additive cumulative adverse effects upon nearby residential receptors. This is most likely to be relevant to residents of properties fronting the B4634 and is anticipated to manifest as disruptions to access

and reductions in amenity – this results in effects on Population, as well as contributing to negative health outcomes for existing residents. Disruptions to access at Gallagher Retail Park may also be exacerbated by construction traffic movements due to the Scheme and RFFP combined, resulting in an additional receptor cluster – business and community facilities at Gallagher Retail Park and their user groups – also experiencing additive adverse cumulative effects.

- Road drainage and water environment – potential interaction with the River Chelt, which could manifest as changes to flow rates and paths and increased additive contamination risks.

15.10.80. Beneficial multi-modal transport impacts of the operational Scheme on prospective residents of the RFFP would be comparable to the general conclusions drawn in relation to residents of north-west Cheltenham (as reported in the Population assessment findings and noted as part of a positive health outcome, but not contributing to a cumulative effect). The potential for the RFFP to interact with the Scheme to generate further cumulative effects in the Scheme operational phase is considered limited and no significant cumulative effects are anticipated.

15.10.81. It is acknowledged that the developers of the RFFP will be required to adhere to environmental legislation that is intended to ensure that single project impacts do not manifest as significant adverse effects – it is assumed that this will be addressed by the developers.

Assessment of inter-project cumulative effects

15.10.82. A precautionary worst case has to be considered for the purposes of the CEA. The Scheme design and environmental design are compatible with the RFFP site being brought forward for development.

15.10.83. The potential for the RFFP to interact with the Scheme to generate further cumulative effects in the Scheme operational phase has been identified in relation to landscape and visual impacts. The RFFP and the Scheme together will contribute to the transformation of a predominantly cultivated landscape into an area of suburban character, much more closely aligned to Cheltenham in terms of built form, recognising that the RFFP is phase 1 of proposals for a larger allocated site that encompasses nursery gardens and allotments. Overall vegetation cover is likely to be substantially reduced. This will affect residents along Homecroft Drive (additive impacts and VR23) as well as recreational users of this part of the study area (VR12) and represents a significant adverse cumulative effect within the topic (see Section 15-13). It is important to note that as an adaptation of an existing linear transport feature, the contribution of the Scheme to this change is far less than that of the RFFP, with the latter dominating (should it be realised).

15.10.84. The CEA has not identified any further additive cumulative inter-project effects of this RFFP with the Scheme that are considered to have the potential to be significant. On this basis there are no significant cumulative inter-project cross-topic effects to be reported in relation to this RFFP.

Assessment of residual effects

15.10.85. There is no requirement for essential CEA mitigation associated with the inter-project cross-topic cumulative effects of the Scheme within this RFFP.

15.10.86. The CEA has not identified any residual additive cumulative inter-project effects of the RFFP with the Scheme.

15.11. Construction of Strategic Highways Projects

15.11.1. There are several GCC and NH Highways Projects with a similar or overlapping construction programme to the Scheme – they do not meet the thresholds for inclusion within the RFFP shortlist, but have been considered on the basis that they could result in cumulative effects with the construction and operation of the Scheme. These are:

- A38/A4019 Junction Improvements at Coombe Hill: This was proposed as part of the

package of improvements proposed for the M5 Junction 10 Improvements Scheme. The proposal has been progressed separately through a TCPA route and an TCPA application (ref. 22/0036/TWR3MJ) was submitted in June 2022. The Scheme has now been conditionally approved and GCC is cognisant of the need to develop construction programming to complement the Scheme.

- Arle Court Transport Hub, Cheltenham: The proposed improvements to Arle Court Park and Ride were part of the package of improvements proposed for the M5 Junction 10 Improvements Scheme. The proposal has been progressed separately through a TCPA route to the M5 J10 Junction 10 improvements. Three TCPA applications (Arle Court highways and civils works ref. 21/0074/CHR3MJ; Arle Court MSCP ref. 22/0002/CHR3MJ; and West of Cheltenham Transport Improvements Scheme Phase 1 ref. 20/0021/CHREG3) have been submitted and the proposal has since received planning permission.
- A417 Missing Link: The proposal includes improvements to the A417 carriageway between the Brockway bypass and Cowley roundabout in Gloucestershire. A DCO was granted on 16 November 2022.

15.11.2. Potential for cumulative effects has been identified in relation to the in-combination impacts of the construction of these GCC highways projects within timescales that overlap either partially or fully with Scheme construction. Of particular importance is the need to ensure that closures of the A4019 for utilities diversions associated with the Coombe Hill junction improvements are not programmed to overlap with the proposed closure of the M5 Junction 10 slip roads, which are described in Chapter 2 (~~application~~Application document TR010063/~~—~~APP/-6.2). Measures G10 and CEA1 of the REAC are relevant to managing these potential cumulative effects (~~application~~Application document TR010063/~~—~~APP/-7.4).

Cumulative inter-project impacts

15.11.3. Taken together, the strategic highways projects affect several of the arterial routes within the strategic transport network of Cheltenham and north-east Gloucester there is a risk that without careful planning and co-ordinated traffic management, temporary closures and diversions within the network could be a source of considerable driver frustration, delay and anxiety, with multiple separate sections of roadworks operating concurrently and therefore limiting options for avoiding temporary delays. In turn, this could contribute to impacts from drivers and WCH seeking alternative routes, potentially along less suitable parts of the network. This could manifest as localised increases in traffic emissions, also affecting noise and air quality; and may also alter the risk profile for all transport modes, introducing new areas of conflicts between modes. These impacts would relate to the Scheme construction phase.

15.11.4. The climate CEA notes that there is the potential for the Scheme and strategic highway projects to deliver beneficial inter-project cumulative impacts once operational. This is based on their role of delivering a future proofed highway network that will offer greater resilience to key impacts of climate change, such as flood risk.

Assessment of inter-project cumulative effects

15.11.5. A precautionary worst case has to be considered for the purposes of the CEA. In terms of the inter-project cumulative effects with the Scheme, the duration could extend across the whole construction phase, where RFFP traffic management is within the same timeframe. The extent of the effect will be the extent of routes that people elect to use to avoid areas under traffic management, as well as the areas of traffic management themselves – it is considered that this could include a wide range of strategic and residential routes within the boundaries of the Cheltenham and north-east Gloucester strategic transport network. The type of effect will be additive between the RFFPs in terms of the noise and emissions associated with road transport movements, but also potentially in-combination with changes to the transport characteristics of residential streets interacting with increased noise, uncertainty about travel planning, journey time delays and frustration leading to adverse amenity effects and mental health effects such as increased stress and anxiety. The effects are likely to be transient within the strategic highway network as a whole, with

different areas becoming the focus as the Scheme and RFFPs progress through their construction activities, although there is anticipated to be a general disruption effect across the network. People will be the principal receptors, with local residents representing a sensitive group and noting that there will be more vulnerable individuals within the population, such as those with underlying mental health conditions, respiratory conditions and heart conditions.

15.11.6. The embedded mitigation, particularly relating to the EMP, as well as essential mitigation for targeted engagement with residents and businesses directly affected by the Scheme are taken into account in the CEA. The CEA also reflects the uncertainty surrounding both the specific proposals for construction sequencing for the Scheme and the other strategic highways projects. **It concludes that there could be moderate to major adverse effects on people living and habitually travelling through and between parts of the Cheltenham and north-east Gloucester strategic highway network, due to temporary disruption and traffic management activities from pipeline strategic highway projects. This would be significant**.

Assessment of residual effects

15.11.7. Essential mitigation has been identified to seek to manage these effects. This would make use of the existing GCC notification of streetworks system to provide a source of information that would allow combined impacts to be evaluated prior to any approvals being issued by GCC for works. This is set out as CEA1 in the REAC (~~application~~Application document: TR010063/~~—~~APP/-7.4) and reproduced in Table 15-7.

15.11.8. The residual CEA takes account of the Scheme design, embedded mitigation and essential mitigation for topics and cumulative effects. The conclusion is that **the residual inter-project cumulative construction effect on people living and habitually travelling through and between parts of the Cheltenham and north-east Gloucester strategic highway network, due to temporary disruption and traffic management activities from pipeline strategic highway projects would be minor adverse and not significant**.

15.12. Summary of inter-project cross-topic cumulative effects

RFFPs

15.12.1. A total of 29 RFFPs were considered for the inter-project cross-topic CEA.

15.12.2. This stage of the CEA scoped out the following five RFFPs on the basis of lack of cross-topic interactions:

- 21/00396/CLE.
- 20/00213/FUL.
- WCS6 Wingmoor Farm East.
- WCS6 The Park.
- WCS6 Wingmoor Farm West.

15.12.3. The potential for cumulative effects has been noted to arise for the remaining RFFPs within the shortlist, as noted in the tabulated analysis. This stage of the CEA concludes that the type, frequency and/or limited extent of cumulative impacts associated with the following 19 of the RFFPs did not equate to significant cumulative effects:

- 22/01377/FUL.
- 19/00937/PDAD.
- 19/00907/PDAD.
- 22/02172/FUL.
- 20/00003/FUL.
- 22/00549/FUL.

- 23/00328/OUT.
- 20/02132/FUL.
- 21/02832/OUT.
- 22/01272/FUL.
- 22/01163/FUL.
- 17/00827/FUL and 1701459/FUL (same application to two LPAs)
- 19/00133/COU.
- 19/01260/OUT.
- 21/02120/FUL.
- 22/00164/PIP.
- 23/00354/OUT.
- 22/00474/FUL.
- 22/00947/FUL.

15.12.4. There are five strategic development sites within the RFFP shortlist that have been subject to a more detailed evaluation of the implications of the cumulative impacts identified, as potentially significant cumulative effects are predicted. These comprise the following, which are then described in turn.

- 16/02000/OUT (Elms Park) – relating to land allocated under Policy A4 –North West Cheltenham Development Area.
- 20/00759/FUL (Swindon Farm) – relating to part of the land allocated under Policy A4 – North West Cheltenham Development Area).
- Safeguarded land to the north-west of Cheltenham (Policy SD5).
- 22/01817/OUT and 22/01107/OUT – relating to part of the land allocated under Policy A7 – West Cheltenham Development Area.
- 21/00872/REM Phase 1 Land at Old Gloucester Road – relating to part of the land allocated under Cheltenham Local Plan Policy HD8 – Strategic Site – land to the north of the B4634.

16/02000/OUT (Elms Park) – relating to land allocated under Policy A4 – North West Cheltenham Development Area

15.12.5. The residual CEA takes account of the Scheme design, embedded mitigation and essential mitigation for topics and cumulative effects. The conclusion is that:

- The residual inter-project cumulative construction effect on the availability of habitat suitable to support protected species in the construction phase would be **minor to moderate adverse, with moderate effects being significant**.
- The residual inter-project cumulative construction and operation effect of urbanising and transformational change on the existing residents of Uckington would be **moderate to major adverse and significant**, varying depending on the capacity of individuals to cope with the transformational change associated with the residential and employment growth within the North West Cheltenham Development Area, partly concurrent with and enabled by the Scheme.

15.12.6. The proposed essential mitigation (CEA2), if successful, has the potential to reduce the magnitude of the adverse impacts on habitats contributing to the cumulative effect to **minor adverse and not significant.**

15.12.7. The proposed essential mitigation (CEA3), If successful, has the potential to reduce the magnitude of the adverse impacts on existing residents of Uckington, particularly to the north of the A4019, contributing to the cumulative effect to **minor adverse and not significant.**

20/00759/FUL (Swindon Farm) – relating to part of the land allocated under Policy A4 – North West Cheltenham Development Area

15.12.8. The residual CEA takes account of the Scheme design, embedded mitigation and essential mitigation for topics and cumulative effects. The conclusion is that:

- the residual inter-project cumulative construction effect on the availability of habitat suitable to support protected species in the construction phase would be minor to **moderate adverse, with moderate effects being significant**.
- The residual inter-project cumulative construction and operation effect of urbanising and transformational change on the existing residents of Uckington would be **moderate adverse and significant**, varying depending on the capacity of individuals to cope with the change associated with the residential development within this part of the North West Cheltenham Development Area, partly concurrent with and enabled by the Scheme.

15.12.9. The proposed essential mitigation (CEA2), if successful, has the potential to reduce the magnitude of the adverse impacts on habitats contributing to the cumulative effect to **minor adverse and not significant.**

15.12.10. The proposed essential mitigation (CEA3), if successful, has the potential to reduce the magnitude of the adverse impacts on existing residents of Uckington, particularly to the north of the A4019, contributing to the cumulative effect to **minor adverse and not significant.**

Safeguarded land to the north-west of Cheltenham (Policy SD5)

15.12.11. The residual CEA takes account of the Scheme design, embedded mitigation and essential mitigation for topics and cumulative effects. The conclusion is that:

- The residual inter-project cumulative construction effect on the availability and continuity of habitat suitable to support protected species in the construction phase would be **moderate adverse and significant**.
- The residual inter-project cumulative construction and operation effect of urbanising and transformational change on the existing residents of the community of Uckington and north of the A4019 would be **moderate to major adverse and significant**, varying depending on the capacity of individuals to cope with the transformational change associated with the residential and employment growth within the safeguarded land to the north-west of Cheltenham, partly concurrent with and enabled by the Scheme.
- The residual inter-project cumulative construction and operation effect of changes to the configuration, availability, amenity and wider connectivity of the WCH network on WCH users of the recreational network close to M5 Junction would be **minor to moderate adverse, with moderate effects being significant**. The variation will depend on the sensitivity of the user and the purpose of their journeys. The moderate adverse effect is most likely for horses and their riders, and those seeking a rural outlook for recreation, but may also be experienced by other users, depending on the capacity of individuals to adapt to change.

15.12.12. The proposed essential mitigation (CEA2), if successful, has the potential to reduce the magnitude of the adverse impacts on habitats contributing to the cumulative effect to **minor adverse and not significant**.

15.12.13. The proposed essential mitigation (CEA2), if successful, has the potential to reduce the magnitude of the adverse impacts on amenity for WCH users to **minor adverse and not significant**; and presents opportunities to realise benefits for the configuration, availability and wider connectivity of the recreational network for existing and prospective WCH users – these could become **minor to moderate beneficial and the latter would be significant**.

15.12.14. The proposed essential mitigation (CEA3), if successful, has the potential to reduce the magnitude of the adverse impacts on existing residents of Uckington and alongside the

A4019, particularly to the north of the A4019, contributing to the cumulative effect from transformational change to **minor adverse and not significant**.

22/01817/OUT and 22/01107/OUT – relating to part of the land allocated under Policy A7 – West Cheltenham Development Area

15.12.15. The residual CEA takes account of the Scheme design, embedded mitigation and essential mitigation for topics and cumulative effects. The conclusion is that:

- the residual inter-project cumulative construction effect on the availability of habitat suitable to support protected species in the construction phase would be **minor to moderate adverse, with moderate effects being significant.**
- The residual inter-project cumulative construction and operation effect of introducing urbanising development within the agricultural landscape on the existing residents of the B4634 and Withybridge Lane would be **moderate adverse and significant**. This would vary depending on the capacity of individuals to cope with the transformational change associated with the residential and employment growth within the West Cheltenham Development Area, partly concurrent with the Scheme.

15.12.16. The proposed essential mitigation (CEA2), if successful, has the potential to reduce the magnitude of the adverse impacts on habitats contributing to the cumulative effect to **minor adverse and not significant.**

15.12.17. The proposed essential mitigation (CEA3), if successful, has the potential to reduce the magnitude of the adverse impacts on existing residents of the B4634 and Withybridge Lane, contributing to the cumulative effect to **minor adverse and not significant**.

21/00872/REM – relating to part of the land allocated under Cheltenham Local Plan Policy HD8 – Strategic Site – land to the north of the B4634

15.12.18. The CEA has not identified any additive cumulative inter-project effects of the RFFP with the Scheme that are considered to have the potential to be significant. There is no requirement for essential CEA mitigation associated with the inter-project cumulative effects of the Scheme within this RFFP.

15.12.19. The CEA has concluded that there are no residual additive cumulative inter-project effects of the RFFP with the Scheme.

Strategic highways projects

15.12.20. The residual CEA takes account of the Scheme design, embedded mitigation and essential mitigation for topics and cumulative effects. The conclusion is that the residual inter-project cumulative construction effect on people living and habitually travelling through and between parts of the Cheltenham and north-east Gloucester strategic highway network, due to temporary disruption and traffic management activities from pipeline strategic highway projects would be **minor adverse and not significant.**

15.13. Summary of inter-project cumulative effects, within topics

15.13.1. This sub-section summarises the significant residual inter-project cumulative effects that have been identified within individual topic assessments. This information draws directly from the source topic chapters, where additional explanation can be found.

Air Quality

15.13.2. There are no inter-project significant additive cumulative effects predicted due to the non-strategic developments that are within the RFFP shortlist.

15.13.3. The assessment has identified the potential for additive cumulative inter-project effects on air quality, principally in relation to emissions associated with additional traffic generation from the strategic development sites. The CEA assumes that the relevant developers of the RFFPs would take into account air quality changes on the local roads, including those

delivered by the Scheme, within the design and masterplanning of these strategic development sites, allowing for suitable control and mitigation of effects.

15.13.4. On the basis of the above assumption, no significant residual cumulative inter-project effects have been identified within the topic assessment.

Noise and Vibration

15.13.5. There are no inter-project significant additive cumulative effects predicted due to the non-strategic developments that are within the RFFP shortlist.

15.13.6. There are no inter-project significant additive construction noise or vibration cumulative effects predicted due to the strategic development sites included in the RFFP shortlist.

15.13.7. There are inter-project additive operational noise cumulative effects predicted due to the strategic developments in combination with the Scheme. The traffic modelling that underpins this additional assessment is Traffic Scenario R, which accounts for the Scheme plus the following three strategic developments and associated assumptions:

- North West Cheltenham Development Area, Off Tewkesbury Road, Uckington (Policy A4) associated with RFFPs 16/02000/OUT, 22/00759/FUL and 23/00354/OUT – with 22% of the total floorspace for residential properties ~~of total Dwellings~~ and 27% of the total floorspace for employment as operational in Traffic Scenario S (with 100% of the development operational in Traffic Scenario R)
- Safeguarded land to the north-west of Cheltenham (Policy SD5) – with 9% of the total floorspace for residential properties ~~of total Dwellings~~ and 10% of the total floorspace for employment as operational in Traffic Scenario S (with 100% of the development operational in Traffic Scenario R)
- West Cheltenham Development Area (Policy A7), associated with application 22/01817/OUT and 22/01107/OUT (the same application made to two separate authorities) – with 23% ~~of total Dwellings~~ of the total floorspace for residential properties and 25% of the total floorspace for employment as operational in Traffic Scenario S (with 100% of the development operational in Traffic Scenario R)

15.13.8. It is important to note that the modelling does not provide a level of granularity that allows traffic to be assigned to the RFFPs separately, therefore each incidence of an in-combination effect is attributed to all three of the strategic sites, which represents a precautionary approach. It is also important to recognise that these effects emerge only when the RFFPs are factored in. The impacts equate to changes of either 3dB or more (moderate to major) or 1dB or more (minor) above the SOAEL threshold, affecting sensitive receptors along the following roads (which are unaffected by the Scheme in isolation).

- Boddington Road/Church Lane.
- The Green/ Road to Elmstone Hardwicke.
- Telstar Way/Fiddlers Green Lane.
- Road from Stoke Orchard to Ashchurch (through Tredington and Fiddington.
- Bishop Cleeve (Cheltenham Road, Voxwell Lane, Gotherington Lane and Evesham Road).
- Cirencester Road and Stillchester Road
- Down Hatherley Road.
- Innsworth Lane.
- Hesters Way Road.

15.13.9. Changes of greater than 1dB are considered to be significant on the basis of the DMRB methodology. However, the determining factor in these instances are the RFFPs as none of these locations feature within the assessment of the Scheme in isolation. Mitigation opportunities for noise at these locations are considered limited. This is due principally to access requirements, with further information provided within the topic chapter.

15.13.10. In essence, these effects are considered unavoidable in seeking to realise the wider benefits of the Scheme. The REAC (Application document TR010063/——App/–7.4), includes a commitment to a process of monitoring Scheme impacts across a range of sustainability criteria and this offers a mechanism for future requirements to be reviewed further if appropriate.

Biodiversity

15.13.11. The potential for interaction of the shortlisted RFFPs within the Scheme biodiversity impacts has been considered. The sifting process used the proximity of the RFFP to the Scheme in accordance with the distance thresholds used for different receptor types within the main assessment; qualitative professional judgement about the potential for interactions through activities such as habitat loss; the potential for recreational pressure to designated sites; and scoped out RFFPs in heavily urbanised locations that are not adjacent to connecting watercourses.

15.13.12. The following RFFPs were noted as having the potential to contribute to inter-project cumulative effects:

- 22/00947/FUL - Hayden Hill Fruit Farm.
- 22/01272/FUL - Pigeon House Farm.
- 22/00164/PIP – Land known as Evergreen Spiritual Pathways.
- 19/00937/PDAD - Barns at Hayden Lane.
- 19/00907/PDAD - A&B Buildings at Pilgrove Farm.
- 22/02172/FUL – Pilgrove Cottage.
- 20/02132/FUL - Warners of Cheltenham Blaisdon Way.
- 21/00872/REM Phase 1 Land at Old Gloucester Road – relating to part of the land allocated under Policy HD8 0 strategic development site in Cheltenham Local Plan – land to the north of B4634 including Hayden Allotments.
- 16/02000/OUT (Elms Park) – relating to land allocated under Policy A4 – North-west Cheltenham Development Area.
- 20/00759/FUL (Swindon Farm) – relating part of the land allocated under Policy A4 – North-west Cheltenham Development Area.
- Safeguarded land to the north-west of Cheltenham (Policy SD5).
- 22/01817/OUT and 22/01107/OUT) – relating to part of the land allocated under Policy A7 – West Cheltenham Development Area.
- 22/01163/FUL – Uckington Farm, The Green.

15.13.13. The principal impact interaction for the non-strategic shortlisted RFFPs was the potential damage to or loss of habitat for barn owls and/or bats, due to demolition proposed within the RFFPs. In all instances, the CEA concluded that there would be no or negligible impacts on the protected species and no significant cumulative residual effects are anticipated.

15.13.14. There are three RFFPs relating to land that is interconnected and partly within and adjacent to the Scheme, extending north from the A4019 corridor. Two of the RFFPs relate to land that is allocated within Policy A4 of the JCS – the North West Cheltenham Development Area; and the third is the safeguarded land to the north-west of Cheltenham. Only one of these RFFPs is yet associated with a consented design (Swindon Farm – 22/00759/FUL); however, as far as is practicable, the Scheme design (including embedded and essential mitigation) has been developed to be compatible with outline proposals, seeking to deliver habitat connectivity and functional ecosystems.

15.13.15. The West Cheltenham Development Area relates to land allocated in Policy A7, extending to the south of the Scheme, south of the B4634 corridor. There is an application for outline consent with a masterplan and this has been reviewed to ensure that the Scheme design (including embedded and essential mitigation) is compatible.

15.13.16. The CEA adopts a precautionary approach – in recognition that proposals for these four RFFPs do not yet all have planning consent, the potential for significant adverse additive

inter-project cumulative effects for dormice and bats remains. In addition, the CEA highlights the additional risks to bats, dormouse, other priority mammals, birds and reptiles via reduced habitat connectivity, if the distribution of habitat provision delivered by each RFFP does not take the delivery timing and location of habitat provision associated with neighbouring development proposals into consideration. It is considered that these inter-project additive and in-combination effects could be significant and mitigation is included within the Scheme.

15.13.17. The Scheme includes commitment CEA2 within the REAC (Application document TR010063/~~-~~APP~~pp~~/~~-~~7.4), which is intended to secure the continued efficacy and realise long term benefits of the Scheme environmental design in the context of strategic development sites, which include the safeguarded land to the north west of Cheltenham, specifically to manage inter-project effects. The adverse effects could be significant; however, effective co-ordination between the Scheme promoter and developers (as advocated through CEA2) have the potential to manage these effects such that they would become non-significant.

Road Drainage and the Water Environment

15.13.18. The potential for interaction of the shortlisted RFFPs with the Scheme road drainage and water environment impacts has been considered. The sifting process for the topic was qualitative, based on professional judgement. It focused on identifying RFFPs that were within the same catchments as the Scheme; of a sufficient size to generate notable impacts to the water environment; in proximity to watercourses; within areas at risk of flooding; and associated with development types or associated activities with greater potential to involve substantial earthworks and /or impacts to waterbodies and overland flow.

15.13.19. The following RFFPs were noted as having the potential to contribute to inter-project cumulative effects:

- 16/02000/OUT (Elms Park) – relating to land allocated under Policy A4 – North-west Cheltenham Development Area.
- 20/00759/FUL (Swindon Farm) – relating part of the land allocated under Policy A4 – North-west Cheltenham Development Area.
- Safeguarded land to the north-west of Cheltenham (Policy SD5).
- 22/01817/OUT and 22/01107/OUT – relating to part of the land allocated under Policy A7 – West Cheltenham Development Area.
- 21/00872/REM – relating to part of the land allocated under Cheltenham Local Plan Policy HD8 – Strategic Site – land to the north of the B4634.

Water quality

15.13.20. The assessment of inter-project cumulative effects on water quality notes the requirement for all developments to adhere to the NPPF paragraph 173~~67~~, which mandates Sustainable Drainage Systems (SuDS) unless there is clear evidence that this is inappropriate. The CEA assumes that SuDS proposals for each RFFP will accommodate temporary drainage requirements during construction and that there will be suitable mitigation of any operational impacts to water quality. On this basis, no significant residual cumulative inter-project effects are anticipated in relation to water quality from the developments proposed within each RFFP.

15.13.21. An assessment has been undertaken to explore the potential impacts to water quality of increased traffic flow, specifically in relation to the strategic development sites allocated or safeguarded in the JCS. This has used a traffic modelling scenario that includes the Scheme and the strategic development sites. This data has informed an accidental spillage assessment. The conclusion is that due to the embedded and essential Scheme mitigation, plus the assumption that all of the RFFPs will adhere to the NPPF, there should be no significant adverse residual cumulative inter-project effects on water quality.

Hydromorphology

15.13.22. The assessment of inter-project cumulative effects on hydromorphology has identified the Leigh Brook as the only relevant receptor. The main assessment concludes that Leigh Brook is of high importance and experiences a slight adverse impact from the Scheme, which does not result in a significant adverse effect. The CEA has highlighted that there is potential for improvements to Leigh Brook as a result of cumulative impacts of hydromorphological and ecological benefits upstream of the M5 through the development of the North West Cheltenham Development Area and safeguarded land to the north west of Cheltenham. However, since there are not yet approved proposals available for all of the RFFPs, a precautionary approach has been adopted. The potential for benefits is noted, but this is not associated with a significant cumulative in-combination residual effect on the Leigh Brook.

15.13.23. There are not expected to be any other significant cumulative effects on hydromorphology as a result of the RFFPs shortlisted for further consideration.

Groundwater

15.13.24. The cumulative groundwater impact assessment has screened in the largest of the RFFPs, comprising the strategic development sites from the JCS. Each of these developments is residential and/or employment led mixed use, meaning that it is unlikely that they would require significant below ground structures or dewatering. Therefore, it is expected that any impact from these developments in combination with the Scheme on the groundwater receptors will be negligible.

Flood risk

15.13.25. The CEA is underpinned by the assumption that separate FRAs will be in place or proposed by the relevant developers for the RFFPs that have been scoped into the assessment. The strategic development sites represent the largest of the RFFPs and separate mitigation will be required to mitigate any flood risk impacts as a result of these developments, including both loss of floodplain storage and flow conveyance.

15.13.26. For all relevant RFFPs, mitigation will be in line with the NPPF and it is assumed that for each RFFP, it will ensure no overall increase in flood risk. As a result of these assumptions and taking account of the embedded and essential mitigation for the Scheme, the conclusion is that there will be no significant cumulative additive inter-project effects relating to flood risk as a result of the RFFPs that have been scoped in.

Landscape

15.13.27. The landscape assessment identified RFFPs from the shortlist with the potential to generate cumulative effects, based on whether they delivered transformational landscape changes and/or had intervisibility with the Scheme. The assessment scoped out the majority of the RFFPs on the basis that they did not give rise to additional cumulative effects.

15.13.28. The following five strategic sites were noted as having the potential to deliver transformational change within the landscape and affected visual receptors relevant to the Scheme:

- 16/02000/OUT (Elms Park) – relating to land allocated under Policy A4 – North-west Cheltenham Development Area.
- 20/00759/FUL (Swindon Farm) – relating part of the land allocated under Policy A4 – North-west Cheltenham Development Area.
- Safeguarded land to the north-west of Cheltenham (Policy SD5).
- 22/01817/OUT and 22/01107/OUT – relating to part of the land allocated under Policy A7 – West Cheltenham Development Area.
- 21/00872/REM – relating to part of the land allocated under Cheltenham Local Plan Policy HD8 – Strategic Site – land to the north of the B4634.

15.13.29. These strategic development sites are noted as the most likely to have large-scale cumulative impacts on the landscape environment, with additional vegetation loss, loss of open fields and increased built elements impacting on both landscape character and visual amenity. **Significant combined effects are expected** in relation to 16/02000/OUT (Elms Park), 20/00759/FUL (Swindon Farm), 22/01817/OUT and 22/01107/OUT (West Cheltenham Development Area); safeguarded land to the north-west of Cheltenham; and 21/00872/REM relating to Policy HD8; however, the causes of these combined effects are likely to be dominated by the proposed developments (RFFPs) rather than the Scheme.

15.13.30. The Scheme anticipates some of the potential landscape and visual effects from the RFFPs that form strategic development sites. Embedded mitigation allows for screen planting, along the A4019 for instance, to provide some buffering between the Scheme and the adjacent developments. The mitigation proposals for the RFFPs are not yet confirmed, thus on a precautionary basis there remains potential for **significant residual inter-project cumulative effects from the RFFPs on the Scheme**.

Geology and soils

15.13.31. The potential for interaction of the shortlisted RFFPs with Scheme geology and soils impacts has been considered. The focus is on RFFPs that are within 500m of the Scheme and likely to have effects that will combine with those of the Scheme, including loss of BMV land, contamination impacts and physical effects. The following RFFPs were shortlisted for further consideration:

- 16/02000/OUT (Elms Park) – relating to land allocated under Policy A4 – North-west Cheltenham Development Area.
- 20/00759/FUL (Swindon Farm) – relating part of the land allocated under Policy A4 – North-west Cheltenham Development Area.
- Safeguarded land to the north-west of Cheltenham (Policy SD5).
- 17/00827/FUL and 17/01459/FUL – Gallagher Retail Park.
- 19/01260/OUT – Land North-West Manor Road.
- 21/02120/FUL – Gallagher Retail Park.
- 22/01817/OUT and 22/01107/OUT – relating to part of the land allocated under Policy A7 – West Cheltenham Development Area.
- 21/00872/REM – relating to part of the land allocated under Cheltenham Local Plan Policy HD8 – Strategic Site – land to the north of the B4634.

15.13.32. There will be loss of BMV agricultural land required for the strategic development sites (as referenced in the JCS). The RFFPs would be required to demonstrate that they have looked to limit the loss of BMV land as far as is practicable within the design of their respective development plans. However, there will be a combined cumulative effect of loss of agricultural land within the Scheme and other developments. Therefore, moderate to very large adverse additive cumulative effects are anticipated which is classed as significant. No additional mitigation is available for loss of agricultural land. This is a matter for compensation and falls outside the EIA process.

15.13.33. During the operation of the Scheme, there is potential for cumulative inter-project effects in relation to an increase in the amount of dust generated (for example, from maintenance works); and the potential introduction of new sources of contamination from the new operational areas associated with the Scheme and RFFPs. The CEA assumes that the Scheme and RFFPs will be operated in accordance with granted consents and the relevant regulations, permits and best practice guidance and pollution prevention. Therefore, it is not expected that the combined impact of these cumulative effects will be greater than those effects predicted for geology and soils during operation of the Scheme as outlined in this chapter. Only negligible to minor adverse cumulative effects are anticipated, which are classified as not significant. No additional mitigation is anticipated.

Cultural Heritage

15.13.34. The potential for interaction of the shortlisted RFFPs with Scheme cultural heritage impacts has been considered. The small-scale residential (<200 homes) and employment

RFFPs and change of use applications were scoped out of further assessment. They are considered to have limited to no potential for impacting any of the heritage assets impacted by the Scheme, recognising their characteristics as housing only and/or infill developments within an already suburbanised landscape.

15.13.35. The focus has been on employment, educational, commercial and industrial developments that are proposed for larger RFFPs, which have the potential to create entirely new development locations within the wider landscape, thus altering historic settlement patterns and meriting fuller consideration of impacts and potential mitigation proposals. On this basis, the following RFFPs were shortlisted in relation to heritage assessment:

- Safeguarded land to the north-west of Cheltenham (Policy SD5).
- North-west Cheltenham Development Area (Policy A4), with related applications 16/02000/OUT and 20/00759/FUL.
- West Cheltenham Development Area (Policy A7), with related application 22/01817/OUT and 22/01107/OUT.

15.13.36. The two development sites (to the West and North West of Cheltenham) are both associated with outline planning applications that are currently under consideration, as well as the consented application at Swindon Farm (22/00759/FUL). The application documents each include emerging detail about environmental impacts, potential effects and measures proposed for further development as mitigation. The balance of adverse effects on cultural heritage would be dominated by those of the RFFPs (primarily relating to the two development sites (to the West and North West of Cheltenham) and the land safeguarded for development to the north west of Cheltenham). The adverse effects are assessed as resulting in **significant adverse in-combination inter-project cumulative effects**, with the Scheme contributing only a small proportion, as reported in the main assessment. Consequently, it is anticipated that the promoters of the RFFPs would be responsible for developing sufficient and appropriate mitigation strategies and/or measures to ensure that their project impacts did not give rise to unacceptable adverse effects. This approach has the potential to reduce the cumulative adverse effect, such that it may no longer be significant.

15.13.37. On the basis of the assumptions above but adopting a precautionary approach due to the uncertainty of the RFFP mitigation measures, the in-combination residual cumulative effects of the combined RFFPs within topic would therefore be expected to be **moderate adverse, which is significant**.

Materials and Waste

15.13.38. The RFFP long-list has been screened to identify projects that are considered to have a realistic prospect of interacting with the Scheme from the perspective of materials and waste. The shortlist of RFFPs was compiled based on professional judgement, focusing on the following characteristics: RFFPs that would be at a comparable scale to the Scheme; RFFPs that would be of a comparable construction type to the Scheme; RFFPs that may potentially require the same types or quantities of materials as the Scheme; and RFFPs that could generate the same types or quantities of waste as the Scheme, either in construction or operation.

15.13.39. The following four RFFPs were shortlisted:

- 16/02000/OUT Elms Park (relating to land allocated under Policy A4 - North West Cheltenham Development Area), North West Cheltenham off Tewkesbury Road Uckington. Outline application for up to 4115 new homes providing a range and choice of mix and tenure. North West Cheltenham Development Area (allocation for 4285 homes and 23 hectares of business use).
- 20/00759/FUL Swindon Farm (relating to part of the land allocated under Policy A4 - North West Cheltenham Development Area), Tewkesbury Road Cheltenham Gloucestershire. Demolition of a ~~dwelling~~ residential property and the erection of 266 ~~dwellings~~ residential properties (Use Class C3), new vehicular and pedestrian access off Manor Road, attenuation basin and ancillary infrastructure. (Part of North West Cheltenham Development Area (allocation for 4285 homes and 23 hectares of

business use)).

- Joint Core Strategy (JCS) safeguarded site (Policy SD5): the safeguarded land to the north-west of Cheltenham (NE of M5 J10). Proposed for residential development (assumption of 2,000 residential properties used for assessment purposes).
- 22/01817/OUT and 22/01107/OUT (a single application made to two authorities relating to part of the land allocated under Policy A7 – West Cheltenham Development Area). Proposed for residential-led development (up to 1,500 homes within the policy allocation), community hub and employment use.

15.13.40. The assumptions for the CEA (Table 15-3~~Table 15-3~~~~Table 15-3~~) indicate that each of the four RFFPs has the potential for some elements of construction to be concurrent with the construction of the Scheme. It is considered that due to their proximity to the Scheme, each RFFP has the potential to contribute to construction additive cumulative impacts on materials and waste.

15.13.41. There is insufficient data in the public domain relating to the RFFPs to undertake a quantitative cumulative assessment. From a qualitative perspective, the RFFPs identified above may experience the following cumulative impacts during the construction phase:

- Difficulty sourcing material types and quantities needed.
- Difficulty being able to find waste management facilities and/or landfill with the capacity to manage or dispose of their waste.

15.13.42. Mitigation measures will be implemented as part of the construction of the Scheme as outlined in Section 12.8. The other developments themselves will also be subject to the NPPF, meaning that they will require mitigation and control measures to be adopted during their construction through management plans to reduce impacts to the environment including excessive material use and/or excessive waste generation.

15.13.43. On the basis of the embedded migration measures for the Scheme and the requirement for the RFFPs to adhere to the NPPF in terms of their own mitigation and control measures, it is not expected that the combined impact of these potential additive cumulative effects will be greater than those effects predicted for materials and waste as outlined in this chapter. Only negligible to minor adverse additive cumulative effects on materials and waste are anticipated, which are classified as not significant. No additional mitigation is required.

Population and Human Health

15.13.44. For the majority of the shortlisted RFFPs, the assessment of the potential for the Scheme to exert a cumulative impact upon them has been assessed as comparable to the effects and health outcomes identified for those receptor clusters to which they would relate. This conclusion relates to the RFFPs that are typically small in scale (i.e. less than 10 ~~dwellings~~ residential properties or below 1ha. for non-residential development) and are proposed within a previously developed location, or are slightly larger in scale but within a cluster identified as having low sensitivity to change.

15.13.45. There are five exceptions to the above conclusions, as described here:

- 16/02000/OUT (Elms Park) – relating to land allocated under Policy A4 – North-west Cheltenham Development Area. The CEA assumptions are that because the development is dependent upon transport infrastructure improvements, which are to be delivered by the Scheme, construction overlap may be anticipated in terms of enabling works and some infrastructure works, but that no residential receptors will be present until the Scheme is operational. On this basis, there is no potential for the Scheme construction works to affect prospective residents of this RFFP. Impacts of the operational Scheme on prospective residents of the RFFP would be comparable to the general conclusions drawn in relation to residents of north-west Cheltenham – large beneficial residual effects on access, which are significant (as reported in the Population assessment findings and noted as part of a positive health outcome).
- 20/00759/FUL (Swindon Farm) – relating to part of the land allocated under Policy A4 – North West Cheltenham Development Area. The CEA assumptions are that because the development is dependent upon transport infrastructure improvements,

which are to be delivered by the Scheme, construction overlap may be anticipated in terms of enabling works, some infrastructure works and the presence of up to 25% of the planned homes when construction starts, rising to 75% when the Scheme is operational. On this basis, there is potential for the Scheme construction works to affect some prospective residents; however, no significant construction effects on Population or Human Health from the Scheme are identified in relation to incoming residents at the RFFP. Impacts of the operational Scheme on prospective residents of the RFFP would be comparable to the general conclusions drawn in relation to residents of north-west Cheltenham - large beneficial residual effects on access, which are significant (as reported in the Population assessment findings and noted as part of a positive health outcome).

- Safeguarded land to the north-west of Cheltenham (Policy SD5). The CEA assumptions are that because the development is dependent upon transport infrastructure improvements, which are to be delivered by the Scheme, construction overlap may be anticipated in terms of enabling works and some infrastructure works, but that no residential receptors will be present until the Scheme is operational. On this basis, there is no potential for the Scheme construction works to affect prospective residents. Impacts of the operational Scheme on prospective residents of the RFFP would be comparable to the general conclusions drawn in relation to residents of north-west Cheltenham - large beneficial residual effects on access, which are significant (as reported in the Population assessment findings and noted as part of a positive health outcome).
- 22/01817/OUT and 22/01107/OUT – relating to land allocated under Policy A7 – West Cheltenham Development Area. The CEA assumptions are that because the development is dependent upon transport infrastructure improvements, which are to be delivered by the Scheme, construction overlap may be anticipated in terms of enabling works and some infrastructure works, but that no residential receptors will be present until the Scheme is operational. On this basis, there is no potential for the Scheme construction works to affect prospective residents. Impacts of the operational Scheme on prospective residents of the RFFP would be comparable to the general conclusions drawn in relation to residents towards the south-western parts of the study area – moderate beneficial residual effects on access, which are significant (as reported in the Population assessment findings and noted as part of a positive health outcome).
- 21/00872/REM – relating to part of the land allocated under Cheltenham Local Plan Policy HD8 – Strategic Site – land to the north of the B4634. The CEA assumptions are that up to 50% of the 85 homes for which planning consent is being sought may be occupied once the Scheme is operational; but that the remainder of the allocated site is known to have multiple constraints that need to be addressed through a masterplanned solution, so there will be no construction overlap of the central and eastern parts of the allocation with the Scheme. On this basis, there is limited potential for the Scheme construction works to interact with the RFFP. Impacts of the operational Scheme on prospective residents of the RFFP would be comparable to the general conclusions drawn in relation to residents of north-west Cheltenham - large beneficial residual effects on access, which are significant (as reported in the Population assessment findings and noted as part of a positive health outcome).

15.13.46. For the majority of the shortlisted RFFPs, the assessment of the potential for the RFFP to exert a cumulative impact upon the Scheme has been scoped out. Typically, this is because the RFFPs are of a sufficiently small scale (i.e. less than 10 ~~dwellings~~ residential properties or below 1ha. for non-residential development) that they would not generate notable additional trips in construction or operation and/or they are proposed within a previously developed location that is already served by an established transport network. In some instances, RFFPs have the potential to generate new destinations (e.g. businesses, retail or community facilities) that would serve residents of the study area; however, these are not considered to be sufficiently large in scale to interact with the Scheme to generate significant cumulative effects.

15.13.47. There are four exceptions to the above conclusions as listed below then described to follow.

- **16/02000/OUT and Policy A4 – North-west Cheltenham Development Area**. There is potential for construction impacts of the Scheme to interact with those of the early construction stages of the RFFP to generate additive cumulative adverse effects upon nearby residential receptors. This is most likely to be relevant to residents of Uckington and Homecroft Drive and is anticipated to manifest as disruptions to access and reductions in amenity - this results in effects on Population, as well as contributing to negative health outcomes for existing residents. Disruptions to access at Gallagher Retail Park may also be exacerbated by works to the Gallagher Retail Park junction and Manor Road junction due to the Scheme and RFFP combined, resulting in an additional receptor cluster - business and community facilities at Gallagher Retail Park and their user groups - also experiencing additive adverse cumulative effects. The RFFP is to the north and east of Uckington, so it will form a potential additional source of construction related noise and visual intrusion (to the Scheme). The access route for the RFFP will be along the A4019 and then Manor Road, meaning it will cross the Order limits adding to traffic that will need to be managed within the Scheme construction. The **additive cumulative inter-project effects of the RFFP on the Scheme, due to the impacts above, are assessed as moderate adverse and significant in the construction phase, affecting residents at Uckington and Homecroft Drive and staff and users of business and community facilities within Gallagher Retail Park**.
- **20/00759/FUL – Swindon Farm (part of North-west Cheltenham Development Area)**. There is potential for construction impacts of the Scheme to interact with those of the construction stages of the RFFP to generate additive cumulative adverse effects upon nearby residential receptors. This is most likely to be relevant to residents of Uckington and along the A4019 east of Uckington and is anticipated to manifest as disruptions to access and reductions in amenity - this results in effects on Population, as well as contributing to negative health outcomes for existing residents. Disruptions to access at Gallagher Retail Park may also be exacerbated by works to Manor Road due to the Scheme and RFFP combined, resulting in an additional receptor cluster - business and community facilities at Gallagher Retail Park and their user groups - also experiencing additive adverse cumulative effects. The RFFP is to the north-east of Uckington, so it will form a potential additional source of construction related noise and visual intrusion (to the Scheme). The access route for the RFFP will be along the A4019 and then Manor Road, meaning it will cross the Order limits adding to traffic that will need to be managed within the Scheme construction. The **additive cumulative inter-project effects of the RFFP on the Scheme, due to the impacts above, are assessed as moderate adverse and significant in the construction phase, affecting residents at Uckington and along the A4019 east of Uckington and staff and users of business and community facilities within Gallagher Retail Park**.
- **Safeguarded land to the north-west of Cheltenham**. There is potential for construction impacts of the Scheme to interact with those of the early construction stages of the RFFP to generate additive cumulative adverse effects upon nearby residential receptors. This is most likely to be relevant to residents of Uckington and the A4019 between M5 J10 and Uckington, and is anticipated to manifest as disruptions to access and reductions in amenity - this results in effects on Population, as well as contributing to negative health outcomes for existing residents. The RFFP is to the west of Uckington and north of the A4019, so it will form a potential additional source of construction related noise and visual intrusion (to the Scheme). The access route for the RFFP will be along the A4019, meaning it will cross Order limits, adding to traffic that will need to be managed within the Scheme. **The additive cumulative inter-project effects of the RFFP on the Scheme, due to the impacts above, are assessed as moderate adverse and significant in the construction phase, affecting residents at Uckington and the A4019 between M5 J10 and Uckington**.
- The Scheme includes an underpass beneath the A4019 to the east of M5 J10. This is intended to connect to the bridleway AUC1 and wider footpath network that exists within the land to which the RFFP relates. The RFFP therefore has the potential to interact with WCH user group receptors, which themselves are anticipated to increase in number once the Scheme is operational due to the enhanced recreational

network in the study area. This represents a potentially significant cumulative inter-project effect on WCH user group receptors - dependent upon the RFFP design and proposals for managing construction (which are not currently known), the resultant effects of this interaction could be beneficial or adverse. **Due to the uncertainty, it is assessed on a precautionary basis (as there is limited information about the RFFP) as moderate adverse and significant in the construction phase**. It would be desirable to seek to ensure that the RFFP design is developed in a manner that would maintain the integrity and benefit the user experience associated with this part of the recreational WCH network.

- **22/01817/OUT and 22/01107/OUT and Policy A7 – West Cheltenham Development Area**. There is potential for construction impacts of the Scheme to interact with those of the early construction stages of the RFFP to generate additive cumulative adverse effects upon nearby residential receptors. This is most likely to be relevant to residents along the B4634 close to the proposed Link Road junction, as well as staff and users of the House in the Tree public house and is anticipated to manifest as disruptions to access and reductions in amenity – this results in effects on Population, as well as contributing to negative health outcomes for existing residents. The RFFP is to the south of the Order limits, south of the B4634, so it will form a potential additional source of construction related noise and visual intrusion (to the Scheme). If the development were to proceed as per the 22/01817/OUT and 22/01107/OUT application plans, the access route for the RFFP in construction will be along the A4019 and then Withybridge Lane, meaning that traffic will cross the Order limits adding to traffic that will need to be managed within the Scheme construction. The Aapplicant is seeking for the Scheme developers and the RFFP developers to coordinate construction activities, works sequencing and approaches to community engagement to reduce cumulative effects. On the basis that the JCS policy requires substantive infrastructure improvements in place before development proceeds, the sequencing assumptions made for the purposes of the CEA mean that there will not be any receptors present during Scheme construction. **The additive cumulative inter-project effects of the RFFP on the Scheme, due to the impacts and the assumptions made for the CEA, are assessed on a precautionary basis as moderate adverse and significant in the construction phase, affecting residents of the B4634 close to the proposed Link Road junction and Withybridge Lane, as well as staff and users of the House in the Tree public house.**

15.13.48. The potential health outcomes and effects arising from the additional residents associated with the four RFFPs noted above are considered within the Human Health assessment. No additional operational cumulative inter-project effects are predicted from these RFFPs in relation to Human Health.

Climate

15.13.49. For the climate assessment, the inter-project in-combination aspect of the CEA is scoped out.

15.13.50. The RFFP long-list has been screened to identify projects that are considered to have a realistic prospect of interacting with the Scheme from the perspective of vulnerability to climate change. Following review of this list, no potential inter-scheme cumulative effects are identified. This is because the RFFPs will not affect the likelihood of climate hazards or their consequences on the Scheme in ways that have not already been considered within the climate vulnerability assessment. Whilst the construction and operation of the RFFPs would result in GHG emissions, the climate vulnerability baseline used in the assessment of the Scheme uses UKCP18 climate projections which already take into account future emissions trends including expected GHG increases from development at a national scale. It is therefore not necessary to consider local inter-project cumulative effects on climate vulnerability impacts.

15.13.51. The inter-project CEA has also considered the potential interaction of the Scheme with the Strategic Highways Projects noted in Section 15.11. The assessment notes that there are alternate road routes around the Scheme using A roads. Junction 9 is well connected to Junction 11a with A roads via the outskirts of Gloucester and Tewkesbury. This route,

and others around the Scheme, including rail links, would provide resilience in the event of climate vulnerability impacts on the Scheme. In addition to the regional A roads around the Scheme the study area also contains a reasonably high density of local roads that provide some flexibility at an unforeseen point of traffic disruption that caused re-routing.

15.13.52. Potential climate vulnerability impacts have been considered in this context. Flood risk is considered to be the most likely to cause wide-spread disruption related to a climate event. The Scheme has been designed to relevant standards with regard to anticipated climate change effects on flood risk. It will therefore improve transport resilience by replacing old degrading assets that were designed with less resilience to climate change than the assets that will replace them. It will also improve accessibility in the study area – thereby reducing traffic disruption and increasing accessibility and so improving resilience to consequences caused by climate vulnerabilities, e.g. failures of surrounding local and regional transport networks, (when compared to the without Scheme scenario). The in-combination inter-project cumulative effects of the operational Scheme and implemented strategic highway projects is considered beneficial, but there is insufficient information to conclude that this would be significant.

15.14. Mitigation measures

Embedded mitigation

15.14.1. The methodology (Section 15.3) sets out the stepped approach that has been adopted to the assessment of cross-topic cumulative effects. At Step 1, the CEA takes account of the Scheme design (as expressed in Chapter 2 of the ES (~~application~~Application document TR010063/—APP/-6.2) and accompanying plans), the embedded mitigation and essential mitigation that has been identified through the individual topic assessments.

15.14.2. The embedded and essential mitigation are set out within the REAC (~~application~~Application document TR010063/-APP/-7.4). The general and topic specific measures within the REAC have been developed in response to matters raised through the specialist topic assessment. In that respect, they all inform the CEA to some extent and, where appropriate, the assessment summary tables highlight key measures.

15.14.3. Impacts on residential amenity, disruption and managing and adapting to the level of change that the Scheme is proposing feature within many of the assessments. Embedded mitigation measures proposed in relation to the work of the Public Liaison Officer (PLO) and set out within the REAC (~~application~~Application document: TR010063/—-APP/-7.4) are considered particularly influential in ensuring that the cumulative cross-topic construction effects identified in the CEA are managed such that they would not become significant and this is reflected in the assessment. General mitigation measures relating to the development, iteration and implementation of the EMP are also key in ensuring that the Scheme impacts on biodiversity, landscape and the water environment and suitably managed and that maintenance continues into Scheme operation.

Essential cumulative effects mitigation

15.14.4. As noted in the methodology (Section 15.3), the CEA draws on the Scheme design, embedded mitigation, essential mitigation for topic-specific effects (Step 1 of CEA) and the essential mitigation for cumulative effects (Step 2) in drawing conclusions about the residual CEA findings (Step 3).

15.14.5. Table 15-7 draws out those measures within the REAC (~~application~~Application document: TR010063/—APP/-7.4) that are of greatest relevance to the cross-topic and inter-project impacts that have been most influential on the CEA findings. The table highlights how they are considered to interact with or influence the CEA findings. Additional information about the interaction of the Scheme with strategic development sites and strategic transport network pipeline projects is described here.

Intra-Scheme cumulative effects

15.14.6. The CEA has identified three principal areas of opportunity to seek to mitigate significant intra-scheme cumulative adverse effects.

15.14.7. There is a need to ensure that there is effective management of traffic during the construction phase. In the context of the CEA findings, this is particularly relevant during the closures of the M5 Junction 10 slip roads – signed diversions prioritising routing along A-roads will be put in place, supported by measures to discourage use of the local road network by HDVs – this will be addressed through measures G4 and G10 as expressed in the REAC (~~application~~Application document: TR010063/~~—~~APP/-7.4).

15.14.8. Opportunities have been identified related specifically to managing amenity and impacts on the character of the transport network and settlements (a product of landscape, noise, visual intrusion and changing settlement characteristics, particularly as a result of increased through traffic owing to the closure of the M5 Junction 10 slip roads) and human health effects (e.g. individual and community stress and anxiety). A particular need has been identified to focus on residents of the community of Uckington and those residing on or close to routes that are expected to experience temporary increases in traffic diverting from M5 Junction 10 when access is unavailable, particularly families with children and adolescents. The relevant measures are CEA1 and CEA3 as expressed in the REAC (~~application~~Application document: TR010063/~~—~~APP/-7.4).

15.14.9. The work of the PLO will be important in ensuring that all communities, including those affected by traffic seeking to divert during the closures of the M5 Junction 10 slip roads, are kept well informed and supported in adapting to the changes during the construction phase – measure PHH9 is particularly relevant to this (REAC – ~~application~~Application document: TR010063/~~—~~APP/-7.4).

15.14.10. The REAC measures relevant to addressing intra-Scheme cumulative adverse effects are reproduced in Table 15-7.

Inter-project cumulative effects

15.14.11. The CEA has identified two principal areas of opportunity to seek to mitigate significant inter-project cumulative adverse effects – the first relates to ensuring that strategic developments are designed in a manner that secures the continued efficacy of Scheme mitigation measures (i.e. continuity of habitats created or strengthened by the Scheme; the recreational network improvements created by the Scheme; and the drainage strategy for the Scheme). The second relates specifically to managing amenity (a product of landscape, noise, visual intrusion and changing settlement characteristics) and human health effects (e.g. individual and community stress and anxiety) particularly on residents of the community of north Uckington. The relevant measures are CEA2 and CEA3 as expressed in the REAC (~~application~~Application document: TR010063/~~—~~APP/-7.4) and reproduced in Table 15-7.

Pipeline strategic highways projects

15.14.12. The CEA has highlighted the importance of co-ordinating highways projects affecting the strategic highway network in Cheltenham and north-east Gloucester. The principal concern is managing human health effects (stress and anxiety from journey delays, uncertainties and the need to adapt to change) that could arise from travel restrictions, particularly for local residents who make habitual journeys along the GCC transport network. In addition, there is a need to ensure that construction programmes are streamlined between the Scheme and other pipeline projects. For example, Coombe Hill junction improvements requires the closure of the A4019 to the west of M5 J10 for a period of time to enable utilities diversions work and it will be important to ensure that there is no overlap with this closure and that of the M5 J10 slip roads, to avoid unduly lengthy diversion routes and consequential effects from traffic impacts. The relevant measure for the coordination of all such highway works is CEA1 as expressed in the REAC (~~application~~Application document: TR010063/~~—~~APP/-7.4) and reproduced in Table 15-7.

Table 15-7 – Selected embedded and essential mitigation measures drawn from REAC

Ref	Objective of the commitment	Description of the mitigation measure or commitment	Key interaction/ influence on CEA findings
G4	Management Plans	Management plans. The PC shall prepare Management Plans for certain environmental topic areas as the detailed design is developed, to include as a minimum the plans listed in Annex B of the EMP (1st iteration) (~~application~~Application document TR010063/~~—~~APP/-7.3). These plans will be appended to the EMP as appropriate. The plans shall be prepared in consultation with the relevant regulatory organisation, relevant planning authority and strategic highway authority and submitted to and approved in writing by the county planning authority.	Securing the relevant management plans for the movement of different types of traffic during the construction phase, including (xi) Traffic Management Plan, (xiv) Emergency Vehicle Movement Management Plan (xvii) Nuisance Management Plan.
G10	Effective Traffic Management	Traffic management will be implemented by the PC to maintain traffic flows during the construction of Junction 10, the Link Road and the widened A4019. This will include local service roads linked to the signalised junctions to enable local residents to retain an ease of access onto the A4019, particularly for turning right (onto the A4019). A minimum of one eastbound (E/B) and one westbound (W/B) traffic lane will typically be maintained on the A4019 throughout the construction period. Exceptions may be required for essential overnight lane closures where single lane working under traffic control may need to be deployed; and in instances where stakeholder engagement through the Public Liaison Officer (see PHH9) proposes alternative traffic management arrangements that are assessed as having Scheme benefits during construction, and approved in writing by county planning authority following consultation with the relevant local planning authority and the strategic highway authority as an acceptable alteration to the Traffic Management Plan. The movements of construction traffic (including the journeys for construction staff to and from the Scheme) will also be managed through this Traffic Management Plan to avoid adverse environmental impacts on the local road network. Construction vehicles will be managed by: - Preferred routes to access each area of the site and from each major source of materials. - Preferred routes during road diversions. - Management measures for construction worker traffic.	Securing the detail of the way in which traffic will be directed to move through the study area during the construction phase, including the management of diversion routes and interventions intended to discourage the use of unsuitable roads by HGVs. This will contribute to lessening adverse human health effects and cumulative effects associated specifically with the duration of the M5 J10 slip road closures.

		The Traffic Management Plan will include temporary diversion routes for all vehicles when sections of the existing highway network must be closed. These diversions will prioritise routing via A-roads. Signage will be implemented to discourage the use of the local road network by HDVs (Heavy Duty Vehicles), except where access is required.	
B7	Habitat creation and management (terrestrial) to compensate for unavoidable habitat loss and provide enhancements	*PARTIAL EXTRACT* An area of farmland to the southeast of Junction 10 will be transformed into an area supporting wetland habitats, scrub, woodland and species-rich grassland, whilst also fulfilling its role as a flood storage area.	Securing the biodiversity elements that contribute to the significant (moderate) beneficial intra-Scheme cumulative effect in the M5 Junction 10 Southern Quadrant.
B18	Construction of Withybridge (A4019) underpass to provide a safe route for badgers and other species	A large underpass (5 m wide and 4 m high) will be constructed underneath the A4019 east of Junction 10 (the Withybridge (A4019) underpass). This will provide mitigation for bats that cross the existing A4019 to the east of the M5, providing a traffic free route for the bats across this road. The Withybridge (A4019) underpass will also provide traffic free access for pedestrians and equestrians across the A4019. Low level lighting will be provided through the underpass, with the lights switched off between sunset and sunrise. The underpass will also allow safe movement of other mammal species, reptiles and amphibians across the A4019 in this location. Light levels will be maintained at no more than 0.2 lux at the entrances to the underpass. This will be achieved through a bespoke back guard on the luminaires directly above the underpass and, potentially, a 'hood' on the entrance of the underpass.	Securing the biodiversity value of the Withybridge (A4019) underpass element of the Scheme that contributes to the (minor) beneficial intra-Scheme cumulative effects in the M5 Junction 10 eastern quadrant. These specifications are also relevant to the inter-project assessment in relation to the RFFP – safeguarded land to the north-west of Cheltenham.
CH2	Minimising effects of the Scheme on the settings of designated heritage assets	Detailed design should ensure the retention of the dark corridors between Uckington and Cheltenham, to preserve the distinct boundaries around Uckington and the designated heritage assets at Moat House. Traffic signals at the realigned A4019/ Moat Lane junction should not be directly visible from the Bridge and Attached Pair of Lodges, Moat House (NHLE 1154528).	Commitment is relevant to the inter-project assessment in relation to the RFFPs – North West Cheltenham Development Area and Policy HD8 of the Cheltenham Local Plan.
PHH9	Prevent adverse effects on human health determinants relating to	Public Liaison Officer (PLO) full-time role to be filled for the duration of the construction phase. The PLO is expected to work directly with the PC (and sub-contractors as appropriate), the Scheme Promoter (GCC) and nominated	Commitment is relevant to addressing the adverse human health effects identified in the

	anxiety and stress and support those who experience difficulty adapting to change	individuals representing the local community. Scope of role to include (but not be limited to): - Responsibility for development, implementation, monitoring and updating of the Community Engagement Plan (see below). - Proactive engagement with the local community, to include face to face introductions for directly affected stakeholders. - Physical and regular presence within the community. - Establishing the feedback loop, process and governance around implementing change in response to feedback during construction, where appropriate. - Commitment to responding to all communications, within agreed timescales and on an equitable basis, in cognisance of the GCC values in both representing and engaging with the local community. - Responsibility for managing communications, including Frequently Asked Questions. The PLO would be expected to provide regular updates and support at Scheme steering groups/board, in addition to the regular board updates that would be provided by the PC. A Community Engagement Plan should be prepared and implemented (by the PLO), outlining the methods in which the local and surrounding community will be engaged during construction of the Scheme including contact details for key site management. The Community Engagement Plan should provide consistent and clear communication to a range of stakeholders including, but not limited to residents, businesses, parish councils and local members (GCC and TBC). The Community Engagement Plan must acknowledge the differing perspectives and issues of each stakeholder. The communication methods must seek to meet the inclusivity/accessibility needs of each stakeholder. The PLO will lead the implementation of the Community Engagement Plan. The Community Engagement Plan should include (but not be limited to): - Contractor-led 'Meet the Contractor' events for supply chain to cover pre-planning and planning stages. - Contractor-led 'Meet the Contractor' share events for the local community. - Dedicated contact routes for the public and stakeholders, to include email, post and telephone number.	intra-Scheme cumulative effects assessment. In particular, the PLO will need to support the adaptation of communities (especially Uckington and families with children and adolescents on affected roads) to the impacts of traffic seeking to divert across the local network during the period of M5 J10 slip road closures, which has been identified as a specific adverse cumulative effect that could be significant.

		- Frequent and regular presence of the PLO and key Project personnel within the community, through public drop in surgeries or similar. - Mechanisms for the supply of frequent and regular updates on traffic management and closures throughout the construction phase, which should be developed to reflect all relevant planned traffic works (i.e. from other GCC projects). - Commitment to maintain/input to Scheme website with latest information throughout the construction phase. - Commitment to input to Scheme bulletins on a frequent and regular basis throughout the construction phase, covering progress, upcoming activities and traffic management and closures. - Process for generating change within the Scheme in response to feedback, using the Compensation Event procedure.	
CEA1	Reducing adverse inter-project cumulative construction impacts of the Scheme and other GCC highways projects disrupting movement across the strategic and local transport network	PC will be required to submit all phasing plans associated with the construction traffic management plan to the GCC streetworks manager on a rolling monthly basis. This will ensure co-ordinated consideration of all streetworks intervention information across projects, capturing all booking system requests for diversions on the GCC highway network; and works will not be implemented until approval and endorsement by GCC is attained. PC may be required to adapt proposals and scheduling in response to streetworks manager requests. The PLO will be required to coordinate dissemination of accurate network disruption information in advance, in accordance with the Communication Engagement Plan. This information should incorporate interfaces with other project impacts on the transportation network, to the extent that they are known (see also PHH4 and PHH9).	Commitment and process is relevant to the inter-project assessment in relation to strategic highway projects.
CEA2	Seeking to secure the continued efficacy and realise long term benefits of the Scheme environmental design in the context of strategic development sites, to manage inter-project cumulative effects	GCC is committed to seeking to establish the right level of discussion, meeting, planning, coordination of programmes and engagement with the public and other stakeholders between GCC officers, the Scheme PC and relevant developers of the safeguarded land to the north-west of Cheltenham, the North West Cheltenham Development Area and the West Cheltenham Development Area. The aim of these endeavours by GCC will be to ensure that proposals for change at these locations complement the intentions of the Scheme, particularly in relation to securing functional ecosystems that continue to support the protected species known to be present in the study area; building on the landscape structure; maintaining connectivity for WCH routes; as well as engaging meaningfully with local	Commitment is relevant to the inter-project assessment in relation to the RFFPs – North West Cheltenham Development Area and safeguarded land to the north-west of Cheltenham.

		communities and stakeholders to support people in adapting to transformational change. The environmental design for the Scheme (Environmental Masterplan (~~application~~Application document TR010063/~~—~~APP/~~-~~2.13)) has been developed to dovetail with the published masterplan that accompanies the outline application that has been made for the Elms Park proposals at the North West Cheltenham Development Area (~~application~~Application reference 16/02000/OUT). Detailed design of the Scheme offers further opportunities for the interface with the Elms Park proposals to be refined, subject to the timeframes of third party developers. Maintenance of the Scheme environmental measures is part of LV3. Correct maintenance of new vegetation is part of LV4.	
CEA3	Managing the inter-project cumulative construction impacts of the Scheme, with the addition of activities from strategic development sites, on residential communities at Uckington, along the A4019, B4634 and at Withybridge Lane.	GCC is committed to seeking to establish the right level of discussion, meeting, planning, coordination of programmes and engagement with the public and other stakeholders between GCC officers, the Scheme PC and relevant developers of the safeguarded land to the north-west of Cheltenham, the North West Cheltenham Development Area and the West Cheltenham Development Area. The aim of these endeavours by GCC will be to ensure that proposals for change at these locations complement the intentions of the Scheme (see CEA2) and that all developers co-ordinate to engaging meaningfully with local communities and stakeholders to support people in adapting to transformational change. This engagement should allow a route for members of the community to be informed, supported and influential in shaping how construction activities from all strategic developments are managed, allowing a route for pro-active prevention, as well as reactive response to issues emerging, particularly around noise, disturbance and community anxiety. The PLO and CEP proposals for the Scheme (see PHH4 and 9) will establish consultation and engagement routes and mechanisms. GCC will seek to encourage developers to integrate or build on these relationships as their proposals unfold, in cognisance of GCC values.	Commitment is relevant to the inter-project assessment in relation to the RFFPs – North West Cheltenham Development Area and safeguarded land to the north-west of Cheltenham.

15.15. Assumptions and limitations

15.15.1. The principal limitations for the CEA relate to the inter-project element of the process, as follows:

- RFFP lists can only ever be a snapshot in time, as activity within the planning system can change on a daily basis.
- Assumptions have to be made about how progressed each RFFP will be relative to the Scheme on the basis of information within the public domain only – this may not

accurately reflect behind-the-scenes progression on any project included within an RFFP short-list.

- Until a project seeking planning permission (and that is outside an allocated or safeguarded site) is formally entered into the planning system, it is not eligible for inclusion within the RFFP short-listing process – projects that may be in a pre-application consultation phase do not qualify, irrespective of scale.

15.15.2. The CEA process can help to identify appropriate proposals for mitigation measures for inclusion within the Scheme (principally in relation to intra-Scheme cumulative effects). It can also identify opportunities for delivering combined mitigation with other RFFPs that may have multiple benefits (as an output of the inter-project cumulative effects assessment); however, the ability of the Scheme promoters to alter other projects is limited to influence through engagement only and may differ by RFFP. This limitation on the CEA process is expressed as uncertainty and reported in accordance with the three factors noted in DMRB LA104. The findings of the CEA will therefore necessarily be limited by this factor in relation to the certainty of proposed mitigation when residual cumulative effects are assessed and this leads to a precautionary worst case being reported.

15.16. Chapter summary

15.16.1. This chapter provides clarification of the CEA methodology and the way in which the CEA findings are reported within the ES. It builds on the introduction to types of cumulative impacts presented in Chapter 4 – Environmental Assessment Methodology (~~application~~Application document TR010063/~~—~~APP/~~-~~6.2).

Intra-Scheme cross-topic CEA key findings

15.16.2. Cross-topic intra-Scheme impacts with the potential to give rise to cumulative effects have been assessed. The assessment takes account of the Scheme design, embedded mitigation and topic-specific essential mitigation.

15.16.3. The CEA has identified two significant adverse cumulative intra-Scheme effects in construction, on a precautionary basis:

- Moderate adverse intra-Scheme cumulative construction effect on residents of Uckington affected by in-combination effects from traffic impacts, due to the closure of the M5 Junction 10 slip roads.
- Moderate adverse intra-Scheme cumulative construction effect on families with children and/or adolescents residing along routes affected by in-combination effects from traffic impacts due to the closure of the M5 Junction 10 slip roads.

~~15.16.4. The CEA has identified one significant adverse cumulative intra-Scheme effect in operation:~~

- ~~Moderate adverse intra-Scheme cumulative operational effect on residents of Uckington to the north of the A4019 (residents of north Uckington).~~

~~15.16.5.~~15.16.4. Additional essential cumulative mitigation measures have been identified to lessen the magnitude of these effects. The relevant measures are G4, G10, PHH7, PHH9, CEA2 and CEA3 as expressed within the REAC (~~application~~Application document: TR010063/~~—~~APP/~~-~~7.4) and reproduced in Table 15-7.

~~15.16.6.~~15.16.5. The CEA has identified one significant beneficial intra-Scheme cumulative operational effect:

- Moderate beneficial intra-Scheme cumulative operational effect on receptors (biodiversity, agricultural land and WCH) in the M5 Junction 10 southern quadrant

~~15.16.7.~~15.16.6. There are **no residual significant beneficial intra-Scheme cumulative construction effects predicted**. The beneficial effects at the M5 Junction 10 southern quadrant receptors are assessed as **residual moderate beneficial intra-Scheme cumulative operational effects**, which are **significant**.

Inter-project cross-topic CEA key findings

~~15.16.8.~~15.16.7. A RFFP long-list is provided as an Appendix 15-1 (TR010063/—APP/-6.15). This has been screened to generate the RFFP short-list that has underpinned the assessment of inter-project cumulative impacts and their consequential effects – a total of 18 RFFPs were scoped in for further assessment. The assessment takes account of the Scheme design, embedded mitigation and topic-specific essential mitigation.

~~15.16.9.~~15.16.8. This aspect of the CEA relies on assumptions made relating to phasing of RFFP development in relation to the Scheme (set out in Table 15-3), as well as the requirement for developers of RFFPs to adhere to all relevant environmental legislation regarding the impacts of their own proposals.

~~15.16.10.~~15.16.9. The inter-project CEA concluded negligible adverse effects for 14 of the RFFPs, which are not significant.

~~15.16.11.~~15.16.10. Potential interactions that could lead to significant adverse (moderate and large) cumulative inter-project effects have been identified in relation to the following four RFFPs, all of which are related to strategic sites or safeguarded land that appear in planning policy documents.

- 16/02000/OUT (Elms Park) – relating to land allocated under Policy A4 – North West Cheltenham Development Area.
- 20/00759/FUL (Swindon Farm) relating to part of the land allocated under Policy A4 – North West Cheltenham Development Area.
- Safeguarded land to the north-west of Cheltenham (Policy SD5).
- 22/01817/OUT and 22/01107/OUT – relating to part of the land allocated under Policy A7 – West Cheltenham Development Area.

16/0200/OUT (Elms Park) – relating to land allocated under Policy A4 – North West Cheltenham Development Area

- The residual inter-project cumulative construction effect on the availability of habitat suitable to support protected species in the construction phase would be **minor to moderate adverse, with moderate effects being significant**.
- The residual inter-project cumulative construction and operation effect of urbanising and transformational change on the existing residents of Uckington would be **moderate to major adverse and significant**, varying depending on the capacity of individuals to cope with the transformational change associated with the residential and employment growth within the North West Cheltenham Development Area, partly concurrent with and enabled by the Scheme.

20/00759/FUL (Swindon Farm) – relating to part of the land allocated under Policy A4 – North West Cheltenham Development Area

- The residual inter-project cumulative construction effect on the availability of habitat suitable to support protected species in the construction phase would be **minor to moderate adverse, with moderate effects being significant**.
- The residual inter-project cumulative construction and operation effect of urbanising and transformational change on the existing residents of Uckington would be **moderate adverse and significant**, varying depending on the capacity of individuals to cope with the change associated with the residential development within this part of the North West Cheltenham Development Area, partly concurrent with and enabled by the Scheme.

Safeguarded land to the north-west of Cheltenham (Policy SD5)

- The residual inter-project cumulative construction effect on the availability and continuity of habitat suitable to support protected species in the construction phase would be **moderate adverse and significant**.
- The residual inter-project cumulative construction and operation effect of urbanising and transformational change on the existing residents of the community of Uckington and north of the A4019 would be **moderate to major adverse and significant**,

varying depending on the capacity of individuals to cope with the transformational change associated with the residential and employment growth within the safeguarded land to the north-west of Cheltenham, partly concurrent with and enabled by the Scheme.

- The residual inter-project cumulative construction and operation effect of changes to the configuration, availability, amenity and wider connectivity of the WCH network on WCH users of the recreational network close to M5 Junction would be **minor to moderate adverse, with moderate effects being significant**. The variation will depend on the sensitivity of the user and the purpose of their journeys. The moderate adverse effect is most likely for horses and their riders, and those seeking a rural outlook for recreation, but may also be experienced by other users, depending on the capacity of individuals to adapt to change.

22/01817/OUT and 22/01107/OUT – relating to part of the land allocated under Policy A7 – West Cheltenham Development Area

- The residual inter-project cumulative construction effect on the availability of habitat suitable to support protected species in the construction phase would be **minor to moderate adverse, with moderate effects being significant**.
- The residual inter-project cumulative construction and operation effect of introducing urbanising development within the agricultural landscape on the existing residents of the B4634 and Withybridge Lane would be **moderate adverse and significant.** This would vary depending on the capacity of individuals to cope with the transformational change associated with the residential and employment growth within the West Cheltenham Development Area, partly concurrent with the Scheme.

~~15.16.12.~~15.16.11. The narrative within this chapter provides a commentary relating to the efficacy of cumulative essential mitigation. This indicates the degree to which successful interaction and influence of the developers of the above four RFFPs may lessen the magnitude of adverse residual inter-project cumulative effects predicted. This does not change the outcome of this part of the CEA, as the level of uncertainty associated with the actions of third party developers is too great for it to change the CEA findings.

Strategic highways projects

~~15.16.13.~~15.16.12. Potential for cumulative moderate adverse effects to be experienced by regular users of the wider Cheltenham and Gloucestershire transport network has been identified, which would be significant. This is due to the number and nature of strategic transport proposals currently in the GCC Highways and NH pipeline.

~~15.16.14.~~15.16.13. Additional essential cumulative mitigation measures have been identified to lessen the magnitude of these effects. The relevant measure is CEA1 expressed within the REAC (~~application~~Application document: TR010063/~~—~~APP/-7.4) and reproduced in Table 15-7. This links to a process that is already established and operational within GCC, which adds surety of its delivery as a mitigation measure.

~~15.16.15.~~15.16.14. The adverse effects on the regular users of the wider Cheltenham and Gloucester strategic transport network are assessed **as residual minor adverse inter-project cumulative operational effects, which are not significant**.

Appendices

Appendix 15.1 – RFFP Long List

Appendix 15.1- RFFP Long List is provided as a separate document (~~application~~Application document TR010063/~~—~~APP/~~-~~6.15).

Appendix 15.2 – Figures

Appendix 15.2 – Figures is provided as a separate document (~~application~~Application document TR010063/~~—~~APP/-6.15).

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