

Report

March 2021



TEMPLE

LEADERS IN ENVIRONMENT,
PLANNING & SUSTAINABILITY.

Rother Valley Railway Track Reinstatement Project

Environmental Statement (ES) 2021 Update

On behalf of: Rother Valley Railway Limited



Document version control

Version	Date	Author	Reviewed by	Reviewed and approved by
1	24/4/20	Robert Slatcher	Carmen Pennisi	Andrew Mayes
2	08/03/21	Various	Robert Slatcher	Andrew Mayes

Report for: **Rother Valley Railway Limited**

Main contributors:

- Noise and Vibration:** John Fisk (Temple Group Ltd)
- Air Quality:** Alaric Lester, Richard Lane (Temple Group Ltd)
- Landscape and Visual:** Carly Tinkler (Landscape, Environmental and Colour Consultancy)
- Ecology and Nature Conservation:** Giles Coe (The Ecology Consultancy)
- Water Quality, Hydrology and Hydrogeology:** Claire Burroughs/ Guy Laister (Water Environment Ltd)
- Archaeology and Cultural Heritage (archaeological remains):** Rebecca Haslam (Pre-Construct Archaeology)
- Archaeology and Cultural Heritage (built heritage assets):** Guy Thompson (Pre-construct Archaeology)
- Traffic and Transport:** John Dooley (Mott MacDonald)
- Socio-Economics:** Mark Teasdale (Temple Group Ltd)
- Land Use and Agriculture:** Peter Williams (Reading Agricultural Consultants Ltd)
- Human Health:** Ellie Holderness (Temple Group Ltd)
- Climate Change:** Andrew Curry (Temple Group Ltd)
- Major Accident Hazards and Disasters:** Stephen Price (Temple Group Ltd)

This report has been prepared by Temple Group Ltd with all reasonable care and diligence within the terms of the contract with the client. We disclaim any responsibility to the client and others in respect of any matters outside the scope of the contract. We accept no responsibility to third parties to whom this report, or any part, thereof is made available. Any such party relies upon the report at their own risk.

Contents

1.0	Introduction	1
2.0	Baseline Description	2
3.0	Changes to Proposed Scheme design and construction	3
3.1	Design	3
3.2	Construction	3
3.3	Operation	5
4.0	Wider Effects	6
5.0	Noise and vibration	9
5.1	Specialist experience	9
5.2	Review of existing ES and Addendums	9
5.3	Continued validity of assessment	14
6.0	Air Quality	15
6.1	Specialist experience	15
6.2	Review of existing ES and Addendums	15
6.3	Continued validity of assessment	19
7.0	Landscape and Visual	24
8.0	Ecology and Nature Conservation	25
8.1	Specialist experience	25
8.2	Introduction	25
8.3	Outline of the approach taken by the Environmental Statement	25
8.4	Mitigation hierarchy and the precautionary principle	28
8.5	Summary of base-line data assumptions	29
8.6	Ecology works 2017-2019	31
8.7	Implemented mitigation measures	38
8.8	Implemented and planned compensation measures	41
8.9	Continued validity of assessment	42
8.10	Conclusion	43
9.0	Water Quality, Hydrology and Hydrogeology	45
9.1	Specialist experience	45
9.2	Review of existing ES and Addendums	45
9.3	Baseline	50
9.4	Continued validity of assessment	55

10.0	Archaeology and Cultural Heritage (archaeological remains)	64
10.1	Specialist experience	64
10.2	Review of existing ES and Addendums	64
10.3	Continued validity of assessment	67
11.0	Archaeology and Cultural Heritage (built heritage)	68
11.1	Specialist experience	68
12.0	Transport and Access	74
13.0	Socio-Economics	75
13.1	Specialist experience	75
13.2	Introduction	75
13.3	Planning policy context	75
13.4	Baseline	76
13.5	Socio-economic effects	78
13.6	Rother Valley Railway Economic Impacts (the Steer report)	79
13.7	Summary	79
14.0	Land Use and Agriculture	81
14.1	Specialist experience	81
14.2	Review of existing ES and Addendums	81
14.3	Continued validity of assessment	82
15.0	Human Health	84
15.1	Specialist experience	84
15.5	Prediction methodology	90
15.6	Limitations and assumptions	92
15.10	Cumulative Effects	116
15.11	Summary and Conclusions	116
16.0	Major Accident Hazards and Disasters	118
16.1	Specialist experience	118
16.2	Introduction	118
16.3	Scope and methodology	119
16.4	Baseline	121
16.5	Mitigation	123
16.6	Assessment of impacts and effects	125
17.0	Climate Change	126

17.1	Introduction	126
17.2	Key Legislation, Policy and Guidance Considerations	127
17.3	Climate Change Mitigation – Assessment Methodology	134
17.4	Baseline Assessment	138
17.5	Identification and Description of Changes Likely to Generate Effect	141
17.6	Assessment of Likely Significant Effects	142
17.7	Additional Mitigation Measures	147
17.8	Residual Effects	147
17.9	Summary and Conclusions	148
18.0	Monitoring	150
19.0	Cumulative Effects	151

Appendices

Appendix A	– Supplementary noise and vibration information
Appendix B	– Landscape and Visual Review
Appendix C	– Water Framework Directive Assessment
Appendix D	- Archaeology Appendix
Appendix E	– Built Heritage Appendix
Appendix F	– Traffic and Transport
Appendix G	- Flood Risk Assessment
Appendix H	– Major Accident Hazards and Disasters
Appendix I	- Reference List

1.0 Introduction

- 1.1.1 The purpose of this technical note is to review the environmental assessments undertaken to date in relation to the Rother Valley Railway Track Reinstatement Project (the Scheme) on behalf of Rother Valley Railway Limited (RVR). Environmental Impact Assessment (EIA) work undertaken to date includes; the original Environmental Statement (ES) submitted in 2014, two addendums to that ES and supporting technical notes. These are described further in **Table 1.1**.
- 1.1.2 The following activities, the findings of which are described within this report, have been undertaken as part of the review:
- update of baseline information;
 - identifying and reviewing updates to policies and plans relevant to the Scheme location and environmental disciplines appraised in the assessments;
 - review of any revisions to assessment methodologies utilised in the assessments and consideration of the potential to affect the outcomes of previous assessment work;
 - consideration of any changes to the Scheme since the assessments were undertaken, including where greater detail is now available; and
 - to address all matters raised in the June 2020, Rule 17- Request for Further Environmental Information.
- 1.1.3 **Table 1.1** describes the environmental documentation prepared to date that has been subject to this review.

Table 1.1: Environmental documentation prepared in support of the Rother Valley Railway Track Reinstatement Project

Report Title	Date	Context
Town and Country Planning Application (June 2014)		
Environmental Statement	June 2014	
Environmental Statement Addendum	November 2016	Updated assessment to capture minor revisions to the Scheme design and supplementary ecological information.
Transport and Works Act Order (April 2018)		
Environmental Statement Addendum	October 2017	Addendum to the ES which addressed the June 2017 TWAO Scoping Opinion for consideration of the Scheme in the context of the High Weald AONB Management Plan
Air Quality Statement – Level crossings and Rolling Stock	October 2018	Technical note with focussed on air quality impacts from the operation of trains within the Scheme and as a consequence of vehicle traffic changes associated with the operation of the proposed level-crossings. The report was produced to address stakeholder responses.

2.0 Baseline Description

- 2.1.1 The site lies between the settlements of Robertsbridge and Bodiam and close to the smaller settlements of Northbridge Street and Salehurst, in the rural landscape of East Sussex. Land use in the area is predominantly agricultural, with both grazing land and arable on the floodplain and the gentle valley slopes. The site itself runs through the floodplain of the River Rother, which is predominantly in pasture adjacent to the original alignment of the railway.
- 2.1.2 The site lies within the High Weald Area of Outstanding Natural Beauty (AONB). Within the footprint of the Scheme there are two priority habitat areas; coastal and floodplain grazing marsh located either side of the A21 north and south of the River Rother and a section of deciduous woodland habitat located within a section of the vegetated extant railway corridor north of Robertsbridge Abbey. Robertsbridge Abbey is a Scheduled Monument located south of the Scheme separated by the River Rother.
- 2.1.3 Each discipline review has revisited the baseline that has informed the respective assessments to verify the continued validity of the assessments. However, in general terms there has been no notable changes to the receiving environment between previous assessments and the present day. A review of all planning consents granted since the original ES has been undertaken and no development has been identified that would affect or could be affected by the Scheme.

3.0 Changes to Proposed Scheme design and construction

3.1 Design

- 3.1.1 Since the original 2014 ES and subsequent November 2016 addendum which addressed subsequent minor changes in the Proposed Scheme, primarily related to amendments to the vertical track alignment and the design of bridges and culverts, there have been no substantive changes to the permanent Proposed Scheme design.
- 3.1.2 There has, however, been additional detailed design work relating to the operation of the level-crossings. A review of the operational safety of the proposed level-crossing on the A21, in consultation with Highways England, has identified the requirement to extend the existing highway lighting southwards by 40m. Existing highway lighting on the A21 at this location only extends 100m south from the roundabout, and there is a risk associated with the transition from lit to unlit conditions and the time it takes drivers' eyes to adjust to the change in light conditions. At present the proposed level-crossing is located within that transition distance and as such the extension of the highway lighting southwards to the level-crossing will avoid the creation of that risk. No additional highway illumination has been identified as required in relation to the level-crossing. This additional piece of permanent design has been considered in the review.
- 3.1.3 In response to a request for additional environmental information, it is necessary to clarify the landscape screening located between Robertsbridge Abbey and the Proposed Scheme. Trees present on the south side of the existing railway embankment will be retained. On the section of route where the embankment needs to be reinstated (i.e. where the former railway embankment has been removed), hedgerow planting will be added on the south side of the railway fence-line.

3.2 Construction

- 3.2.1 Since the original 2014 ES and subsequent addenda, additional detailed work has been undertaken in relation to the spatial provision required for the purposes of construction and construction access. This work has identified additional areas of temporary land acquisition that were not previously assessed. These additional areas are summarised below:
- an area approximately 330m² in size located adjacent north-east of the Northbridge Street crossing of the River Rother to accommodate a temporary access from Northbridge Street;
 - an area approximately 600m² in size located either side of the River Rother east of The Clappers, for the purposes of construction access;
 - an area approximately 1,640m² in size located adjacent north of the Scheme and adjacent west of the A21, for the purposes of construction access and temporary access west from the A21;
 - an area approximately 4,670m² in size located adjacent east of the A21 and north of the Scheme alignment, for the purposes of construction access and temporary access east from the A21 and south from Church Lane. The previous construction access route alignment from Church Lane has been removed from the Scheme (970m²);

- an area approximately 1,560m² in size located south of the Proposed Scheme alignment upstream of the confluence of the River Rother and Mill Stream, for the purposes of construction access; and
- an area approximately 435m² located south of the Proposed Scheme and south of Salehurst, for the purposes of construction access.

3.2.2 The addition of these areas of temporary land acquisition within the Proposed Scheme will be considered in this report for each topic. It should also be noted that construction has commenced on an approximately 480m section of the extant railway between Austens Bridge and Junction Road during 2019. Work has included vegetation clearance, works to existing culverts and ditches and preparation of the trackbed.

3.2.3 **Table 3.1** describes the revised construction programme. The activities and durations are unchanged from those described in the 2014 ES.

Table 3.1: Construction Programme

Date	Activity
January / February 2023	Establish Site compound and access points
April / July 2023	Construction of bridge 12
April / July 2023	Construction of bridge 6
August 2023	Start of embankment earthworks
November 2023	Start of culvert construction
December 2023 / February 2024	Creation of track sub-base for use as haul route
March / June 2024	Ballasting
July 2024	Junction Road level-crossing construction
August / November 2024	Installation of signalling equipment
August / November 2024	Installation of track
September 2024	Bridleway level-crossing construction
October 2024	A21 level-crossing construction
November 2024	Northbridge Street level-crossing construction
December 2024	Early estimate completion date
June 2025	Late estimate completion date

Public Right of Way Diversion and Bridleway Level-Crossing

- 3.2.4 A permanent diversion of the public right of way Footpath S&R 31 and a combined pedestrian and bridleway crossing for Bridleway S&R 36b will be required as part of the Proposed Scheme.
- 3.2.5 The Order makes provision to ensure a temporary or permanent solution is provided to maintain the continuity of Footpath S&R 31 during the construction of the Proposed Scheme. Therefore, Footpath S&R 31 will remain open throughout the construction process.
- 3.2.6 In a change from the assumption in the 2014 ES, it will be necessary to undertake two daytime closures of Bridleway S&R 31 during construction.

Flood Defence Enhancements

- 3.2.7 Further flood modelling work was undertaken in 2016 since the 2014 ES. This modelling identified that flood defence enhancement work that was previously identified is no longer necessary. Flood defence enhancement work no longer forms part of the Proposed Scheme design.

3.3 Operation

- 3.3.1 The operational service assumptions made in the 2014 ES remain valid.
- 3.3.2 The Proposed Scheme operation description in the 2014 ES identified services on 160 days of the year, the majority of which were between April and October. The most common service pattern would be 5 daily return journeys with a maximum service pattern of 8 return journeys.
- 3.3.3 The exact service pattern varies from year to year but confirmed timetables from 2019 and 2020 (pre-Covid restrictions) scheduled services on 180 and 162 days respectively. The most common service pattern remains that of 5 daily return journeys. The maximum daily service pattern is 8 return journeys a day, which are restricted to special event days.

4.0 Wider Effects

- 4.1.1 To be legally compliant, the ES must have assessed the scheme for which powers are sought in the Transport and Works Act and as shown on the deposited Order plans and sections. The draft Order contains powers in paragraph 6 to construct the railway within the limits of deviation shown on the Order plans, in accordance with the levels shown on the Order sections.
- 4.1.2 However, in paragraph 8, the draft Order goes on to provide some flexibility to allow the construction to deviate laterally within the limits of deviation shown on the Order plans. It also permits vertical deviation from that shown on the Order sections by up to 1.5m upwards or to any extent downwards as may be found to be necessary or convenient.
- 4.1.3 As the draft Order provides flexibility within these limits for where the works may be constructed, the ES needs to assess the likely significant effects which may arise from construction of the works across the permitted limits. The purpose of the wider effects assessment is to identify any change to the significant effects that could arise if the Proposed Scheme were to be built in any position within the wider extent of limits and levels set out in the Order.
- 4.1.4 Wider effects result from changes to the likely significant effects as reported in the ES. Such changes may comprise:
- a change to a likely significant effect as currently predicted;
 - the avoidance of a likely significant effect through its removal or by rendering it no longer significant; or
 - the introduction of a new significant effect.
- 4.1.5 Although the Order permits a defined lateral and vertical deviation, in reality that limit will in practice not be achievable across the whole Proposed Scheme due to various constraints upon the Proposed Scheme design including existing infrastructure, fixed design points (e.g. connections to existing track), environmental constraints and engineering feasibility constraints. The track design requirements for railways limits the maximum achievable track gradients and as such fixed locations in the design can preclude significant changes in the vertical track alignment over a considerable distance either side of the constraining fixed track location.
- 4.1.6 When all these factors are taken into consideration it is possible to define sections of the Proposed Scheme where spatial variation within the defined limits will be restricted. For example, the unlimited vertical deviation downwards is in fact constrained by the lateral limits of deviation and engineering feasibility. The physical footprint of the lateral limits would preclude the construction of a deep cutting as there would be insufficient space to accommodate the required earthworks. The engineering solution in such a scenario would be to construct vertical retaining walls in order to achieve a significant lowering of alignment within the available Proposed Scheme footprint. However, such a solution would likely be unfeasible due to a disproportionate cost associated with the infrastructure required, especially when there would be no benefits to the Proposed Scheme associated with such a change to the design. **Table 4.1** identifies the various constraints from east to west that restrict the use of the available limits.

Table 4.1: Limits of Deviation Review

Location	Vertical Limit	Lateral limit	Explanation
Northbridge Street to the A21	<p>Variations within this section of route are constrained by five key factors which preclude major changes in the vertical alignment.</p> <ul style="list-style-type: none"> • The requirement to connect with the existing section of line to the west of Northbridge Street fixes the vertical alignment at this location • The need to cross Northbridge Street at grade fixes the vertical alignment at this location • The need to maintain sufficient clearance over the River Rother at the crossing adjacent east of Northbridge Street limits the opportunity for significant lowering • The need to provide an agricultural level-crossing would limit raising or lowering the alignment at this location • The need to cross the A21 at grade fixes the vertical alignment at this location 	<p>Variations in the lateral limit within this section are constrained by:</p> <ul style="list-style-type: none"> • The requirement to connect with the existing section of line to the west of Northbridge Street • Insufficient space north of the centre line within the defined Limits of Deviation to accommodate an embankment associated with a lateral northern movement of the centre line 	<p>The presence of several constraints over a short section of route (c.300m) fixes the Proposed Scheme alignment and significantly limits opportunity to vary the vertical limit to an extent that would affect the findings of the ES.</p> <p>The presence of these constraints also limits the opportunity for lateral deviation between the fixed scheme points (e.g. the fixed location of the connection to the existing railway to the west).</p> <p>Overall, it is not anticipated that sufficient spatial deviation in the Proposed Scheme could be achieved within this section to generate new or different significant effects.</p>
A21 to Bridleway S&R 36b	<p>Variations in the vertical limit within this section of route are constrained by several factors which preclude major changes in the vertical alignment.</p> <ul style="list-style-type: none"> • The need to cross the A21 at grade fixes the vertical alignment at this location • The need to maintain sufficient clearance over the Mill Stream would preclude significant lowering at this location • The need to provide an agricultural level-crossing and diversion of Footpath S&R 31 would limit raising or lowering the alignment at this location • The need to provide sufficient clearance over the drain located east of Mill Stream would preclude significant lowering at this location • The need to provide sufficient clearance for drainage and flood relief culverts would preclude lowering at this location 	<p>Variations in the lateral limit within this section are defined by the Limit of Deviation shown on the order plans. Within this section the width of the Limit of Deviation is approximately 19m wide. Due to the necessary width of the track form either side of the centre line it would not be possible to deviate the centre line laterally to the full extent of the limit boundary. The ability to deviate laterally would be further constrained by any height difference between the track and the adjacent ground as earthworks would also need to be accommodated within the Order limits.</p>	<p>The narrow limit of deviation defined on the Order plans would restrict any notable lateral deviation in the Proposed Scheme centre line throughout this section.</p> <p>Significant track lowering would be precluded by the clearance requirements for watercourses, flood relief culverts and land drainage infrastructure. In addition, the lateral limits of deviation may preclude the creation of large cuttings depending on the depth of any proposed lowering.</p> <p>Track raising would be constrained by the various agricultural and public rights of way crossings on this section but could be achieved away from crossing points. However, there is no design driver to significantly raise the track along this section as it would require the import of a large volume of fill material to create</p>

Location	Vertical Limit	Lateral limit	Explanation
	<ul style="list-style-type: none"> The need to provide an agricultural level-crossing south of Salehurst would limit raising or lowering the alignment at this location The need to provide a level crossing for Bridleway S&R 36b would limit raising or lowering the alignment at this location. 		<p>the necessary embankment structure.</p> <p>Overall, it is not anticipated that sufficient spatial deviation in the Proposed Scheme could be achieved within this section to generate new or different significant effects.</p>
Bridleway S&R 36b to Junction Road	<p>Variations in the vertical limit within this section of route are constrained by several factors which preclude major changes in the vertical alignment.</p> <ul style="list-style-type: none"> The need to provide a level crossing for Bridleway S&R 36b would limit raising or lowering the alignment at this location The need to provide sufficient clearance for drainage and flood relief culverts would preclude lowering at this location The need to provide an agricultural level-crossing 200m east of Bridleway S&R 36b would limit raising or lowering the alignment at this location The need to connect to the existing remnant track bed which commences north of Robertsbridge Abbey would limit significant vertical alignment changes in this section. The need to cross the River Rother at the site of Austens Bridge would preclude significant lowering at this location The trackbed east of Austens Bridge all the way to Junction Road has been constructed and as such there will be no variation in the vertical alignment. The need to cross Junction Road at grade. The need to connect to the existing Kent and East Sussex Railway east of Junction Road 	<p>Variations in the lateral limit within this section are defined by the Limit of Deviation shown on the order plans. Within this section the width of the Limit of Deviation is approximately 19m wide. Due to the necessary width of the track form either side of the centre line it would not be possible to deviate the centre line laterally to the full extent of the limit boundary. The ability to deviate laterally would be further constrained by any height difference between the track and the adjacent ground as earthworks would also need to be accommodated within the Order limits. In addition there are several locations in this section where the lateral position of the Proposed Scheme are largely fixed: Austens Bridge, the already constructed trackbed east of Austens Bridge, the proposed level crossing across Junction Road and the Kent and East Sussex Railway (KESR) connection east of Junction Road</p>	<p>The original railway earthworks are still intact for the majority of this section and an approximately 475m length of the track bed east of Austens Bridge has been reinstated. The narrow limit of deviation defined on the Order plans would restrict any notable lateral deviation in the Proposed Scheme centre line beyond those areas that have already been reinstated.</p> <p>Significant track lowering would be precluded by the clearance requirements for watercourses, flood relief culverts and land drainage infrastructure. In addition, the lateral limits of deviation may preclude the creation of large cuttings depending on the depth of any proposed lowering.</p> <p>Track raising would be constrained by the fixed sections of reinstated trackbed bound either side by Austens Bridge to the west and the Junction Road and KESR connection to the east. The retention of the original railway earthworks over the majority of the remaining section of route means that works would be limited to the reinstatement of the trackbed on top of the existing earthworks which would not change the vertical alignment.</p> <p>Overall, it is not anticipated that sufficient spatial deviation in the Proposed Scheme could be achieved within this section to generate new or different significant effects.</p>

5.0 Noise and vibration

5.1 Specialist experience

- 5.1.1 John Fisk from Temple Group has undertaken the review. He has thirteen years' experience in acoustics consultancy. He has worked on EIA noise and vibration chapters for ES reports and assessments for planning. He is also experienced in local authority and public consultation. He has worked on route appraisal, optioneering, EIA and public consultation for High Speed 2 (HS2). His responsibilities in this work have involved producing and managing robust methodology for route option noise appraisal (implementing WebTAG) and assessment of the Proposed Scheme, advice on potential impacts, mitigation and reporting. He is experienced in detailed noise modelling for road and rail traffic noise, mechanical plant noise sources, construction noise and other industrial sources involving the use of Cadna-A and GIS software. John has also presented at a number of Institute of Acoustics conferences on his work on railway noise.
- 5.1.2 John is a member of the Institute of Acoustics (MIOA) and has an MSc in Acoustics from the University of Surrey as well as a BSc (Hons) in Physics from Imperial College London.

5.2 Review of existing ES and Addendums

Policy and regulations

- 5.2.1 Legislation and regulations informing the noise and vibration assessment is as follows:
- Control of Pollution Act (CoPA), 1974;
 - Environmental Protection Act (EPA), 1990;
 - The Noise Insulation (Railways and Other Guided Transport Systems) Regulations (NIR), 1996 (as Amended).
- 5.2.2 All the above legislation and regulations are still current.
- 5.2.3 Planning policy informing the ES the noise and vibration assessment is as follows:
- National Planning Policy Framework (NPPF), 2012;
 - Noise Policy Statement for England (NPSE), 2010;
 - Rother District Local Plan (Adopted 2006).
- 5.2.4 The NPPF was updated at various times since 2012, most recently in February 2019. The changes in the framework are not considered likely to lead to changes in the approach or findings from the ES. The NPSE is still current.
- 5.2.5 The Rother District Local Plan (Adopted 2006) is still in use, but the Core Strategy adopted in 2014 supersedes most policies. The changes in policy are not likely to lead to changes in the approach or findings from the 2014 ES.
- 5.2.6 The "Planning Noise Advice Document: Sussex" was published in July 2015 after completion of the 2014 ES. This provides advice for developers and their consultants when making a planning application in East and West Sussex. The document is an advice

document only and not planning policy. The methodology presented in the 2014 ES is consistent with the recommended approach to construction noise assessment. The advice document also refers to assessment of rail development and advises using Design Manual for Road and Bridges (DMRB), applying the noise insulation regulations and using the WHO night noise guideline of 40dB $L_{night,outside}$ as a noise threshold. DMRB is specifically for road schemes, but the noise change impact criteria are the same as used in the RVR ES for assessment of rail noise. Noise insulation regulations are also referred to in the 2014 ES and there is no night noise operation of the rail so the night-time criteria is not relevant for the Proposed Scheme.

5.2.7 Standards and guidance informing the 2014 ES noise and vibration assessment are as follows:

- British Standard 7445-1 'Description and Measurement of Environmental Noise' (1991) – this is a superseded version of the standard which was replaced in 2003. It's not expected the changes would have affected the methodology.
- British Standard 6472-1 'Guide to Evaluation of Human Exposure to Vibration in Buildings' (2008) – this is the current version of the standard.
- British Standard 5228 'Noise and Vibration Control on Construction and Open sites' (2014) – this is the current version of the standard (i.e. BS 5228-1:2009+A1:2014 and BS 5228-2:2009+A1:2014)
- British Standard 7385 'Evaluation and Measurement for Vibration in Buildings' (1990) – this is a superseded version of the standard which was replaced in 2010 by BS ISO 4866:2010. No vibration measurements were completed for the project and vibration impact criteria is taken from elsewhere so the standard is not used in the assessment so not expected the update would have affected the assessment.
- Calculation of Railway Noise (CRN), (1995) – this is the current version.
- Calculation of Road Traffic Noise (CRTN), (1998) – this is the current version, though the date should say 1988 (presumed typo).
- DMRB (2011) – the noise and vibration guidance (HD 213/11) has recently been superseded by LA111. There are many updates contained in the new version. The guidance has been used for the assessment of construction traffic noise impact. While the wording in the guidance has changed, the method of looking at roads with a greater than 1dB change only has not changed, so the updates are not expected to change the assessment.
- The Department for transport's transport analysis guidance (WebTAG) and WHO community noise guidelines 2000 are also referred to in the methodologies. Both of which have seen updates or revisions since the RVR ES was produced but the changes are not likely to affect the methodology or findings.

5.2.8 In summary, there are some updates and changes to standards, guidance and policy but none are likely to affect the assessment method or findings.

Methodology and best practice

Construction noise assessment

5.2.9 The construction noise assessment methodology is a comparison of predicted noise levels against significance criteria. Predictions are made using BS 5228 calculation methods and the significance criteria is taken from BS 5228 and significant observable adverse effect levels (SOAEL) and lowest observable adverse effect levels (LOAEL) are defined. This is still consistent with current practice.

5.2.10 Note there are a couple of typo errors in the ES 2014, Table 6.3:

- “ $\geq L_{Aeq, t} - 5\text{dB Daytime (07:00 – 19:00)}$ ” should say 75dB not 5dB
- “the criteria set out in table 6.1” should refer to table 6.2

Construction Vibration Assessment

5.2.11 The construction vibration assessment uses guidance and criteria from BS 5228 which is still current and gives significance criteria setting SOAEL and LOAEL levels. This is still consistent with current practice.

Off-Site Construction Vehicle Effects

5.2.12 Detailed construction traffic noise assessment is scoped out using criteria in DMRB. The method used is still consistent with current practice.

Operational Rail Noise Assessment

5.2.13 The operational rail noise assessment compares predicted rail noise levels to threshold criteria and change in noise level criteria (determined using the baseline survey information).

5.2.14 The impact criteria are based on precedent from other rail schemes as well as guidance from WebTAG and WHO community noise guidelines and are consistent with current practice, identifying LOAEL and SOAEL levels.

5.2.15 As stated in the 2014 ES there is no official guidance on the prediction of noise from steam locomotives; this is still the case. CRN has been used as the best available method with source terms determined from measurements of the trains and review of the applicability of CRN propagation determined from measurements of the trains at different distances from the track.

5.2.16 The methodology is reasonable, and the same method is likely to have been used now as when the 2014 ES was completed. Given the methodology was developed for the 2014 ES there are a number of potential uncertainties, however the predicted noise levels would have to be substantially higher than those presented in the 2014 ES to lead to identification of minor or moderate effects (a 9dB and 13dB increase required for minor and moderate effects respectively) which given the worst case assumptions used in the prediction methodology is highly unlikely. Therefore, it is expected that the findings are sufficiently robust.

5.2.17 The uncertainties in the methodology mentioned above are addressed in the ES and include:

- Source noise level – source term measurements were completed but the results were variable so there is uncertainty. The worst case result was used which is quite substantially a worst case and up to 5dB higher than some of the other measurements.
- Applicability of CRN for propagation calculations – the source measurements were completed at different distances from the track in conditions very similar to the new track. The source measurements generally show the CRN predictions do not substantially underestimate the attenuation due to distance at 60m. Because of the worst case approach taken with the source term, when combined with the CRN propagation calculation, the result at 60m is still 2dB higher than any of the measured values at 60m.

5.2.18 Though there is further detail in Appendix 5 of the 2014 ES, the ES lacks several details regarding the source term measurements and noise level predictions. These are appended to this report in Appendix A for information.

Operational Rail Vibration Assessment

- 5.2.19 The operational rail impact criteria are determined using BS 6472 and SOAEL and LOAEL levels are identified and are still consistent with current practice.
- 5.2.20 The assessment method is to review whether there are receptors within a screening distance of 50m from the railway track. The evidence base for the 50m distance is not presented but based on the authors professional experience. It is also indicated that there are receptors within 60m, but these are not identified. Those receptors within 60m are identified as experiencing negligible effects due to the low running speeds and low numbers of trains.
- 5.2.21 It is likely that the 2014 ES conclusions are correct for the reasons stated (particularly as the VDV (vibration dose value) criteria is a 16 hour value, so a few perceptible vibration events can occur within a day without causing an adverse effect), however vibration measurements of the current trains might have been useful to supplement the assessment and increase the evidence base. Some source vibration measurements were undertaken at the time but not presented in the 2014 ES. Additional information regarding these measurements is contained within Appendix A and they demonstrate that the conclusion given in the 2014 ES is reasonable.

Methodology Summary

- 5.2.22 While there is potential for one or two criticisms of the operational rail noise and vibration assessment, given there is no or very little guidance related to the assessment of these from historic railways, overall the methodologies employed for the noise and vibration assessments represent current practice.

Baseline

- 5.2.23 In the 2014 ES the baseline was determined through noise surveys at nearby sensitive receptors. This was a combination of long term unattended and short term attended measurements. At a few locations, measurements were not able to be undertaken as access was refused, but alternative data was used from similar locations which is appropriate. The method is robust and in line with current practice.

- 5.2.24 In general, the dominant noise source at the measurement positions was road traffic with other contributing sources listed as industrial/agricultural, some light aircraft and bird song.
- 5.2.25 Road traffic flow data from April 2019 has shown traffic figures on the A21 (the main road likely to predominantly affect road traffic noise levels at the most affected receptors) have increased since the traffic data was collected for the 2014 ES. The change is likely to be relatively low or negligible for noise impact, however for the purposes of the 2014 ES any increase in baseline road traffic noise levels will only reduce the noise impact of the Proposed Scheme.
- 5.2.26 No nearby new noise generating developments have been identified which might also affect the baseline at the identified receptors; and no noise generating uses are likely to have been removed which would lower the baseline (given road traffic noise is dominant at all locations).
- 5.2.27 Given the baseline noise levels are only likely to have increased due to growth in road traffic and that the change is also likely to be negligible, the assessment is considered to be robust and the baseline is still sufficient.

Changes to the Proposed Scheme design and construction

- 5.2.28 Since the 2014 ES and subsequent 2016 Addendum which addressed subsequent minor changes in the Proposed Scheme design, there have been no changes to the permanent Scheme design. The only changes identified are detailed design of the level crossings and identification of additional areas of land required for construction.
- 5.2.29 The changes to level crossings are to do with lighting which will not affect the noise impacts identified.
- 5.2.30 The changes to land required for construction may have the effect of bringing some construction plant closer to receptors than identified in the original ES, particularly those identified near Northbridge Street and Rutley Close. These receptors are already identified as being subject to moderate adverse effects in the ES from construction. Various best practicable means mitigation measures are identified. With these mitigation measures in place, the residual adverse effects are likely to be the same as those reported in the original ES.

Noise impact from the level crossings

- 5.2.31 Noise impact from the level crossings was not included in the scope of the original ES. Based on the operational service pattern this may operate up to 16 times a day but far more frequently around 10 times a day (or not at all for around 192 days of the year). This frequency is for an 8-hour period from 10:00hrs to 18:00hrs¹, so a worst-case day would have the level crossing operating roughly every half an hour but much less frequently for the majority of the time. The crossings are located at Northbridge Street, the A21 and the

¹ There is also the potential for an evening dining car service on Saturdays which would add another two pass-bys one day a week, which are expected to finish by 11pm and therefore within the 16 hour daytime period 0700-23:00. If the service operates past 11pm, the night time noise level will also be negligible and any night time noise effect would be negligible.

B2244 Junction Road with receptors approximately 50m, 100m and 140m away respectively.

5.2.32 The potential for noise impact due to level crossings has been discussed below for:

- Noise from warning alarms while the crossing is closing; and
- Noise from road traffic stopping at the level crossing.

5.2.33 Noise from warning alarms while the crossing is closing have the potential to be audible at the nearest receptors, particularly outdoors, but specific predicted noise levels have not been quantified; it should be noted that the alarm is only for pedestrians so the noise level would be relatively low (compared to an alarm which would be warning motorists). Indoor noise levels will be substantially reduced, particularly with windows closed.

5.2.34 Noise from road traffic stopping at the level crossing is only likely to reduce overall daily noise levels (noise impact from road traffic uses the $L_{A10,18\text{hour}}$ indicator to assess impact) as slower moving traffic generates lower noise levels than faster moving traffic; however noise from stopped traffic would be of a different character (i.e. engine idling noise and acceleration rather than tyre noise from free flowing traffic).

5.2.35 In both cases, the relatively short duration and low number of operations (with a large proportion of the year where it doesn't get used at all) combined with the distance to receptors mean that significant noise effects are unlikely and it is considered reasonable to have left them out of the scope of the 2014 ES.

5.3 Continued validity of assessment

5.3.1 There are some updates and changes to noise and vibration standards, guidance and policy but none are likely to affect the assessment method or findings.

5.3.2 While there is potential for one or two criticisms of the operational rail noise and vibration assessment, largely given there is no or very little guidance related to the assessment of these from historic railways, overall the methodologies employed for the noise and vibration assessments represent current practice.

5.3.3 Given the baseline noise levels are only likely to have increased due to growth in road traffic and that the change is also likely to be negligible the assessment is considered to be robust and the baseline is still sufficient.

5.3.4 Changes to the Proposed Scheme are not likely to affect the conclusions of the original ES.

5.3.5 In summary, the noise and vibration assessment in the ES remains robust.

6.0 Air Quality

6.1 Specialist experience

- 6.1.1 Alaric Lester is an Associate at Temple Group. He has 25 years' experience in air quality assessment, management and policy. His experience in assessment of major infrastructure proposals includes HS2 Phase 2b, HS2 Phase 1, the Tramtrack Croydon extension, Farnborough Airport expansion and Heathrow Airport expansion. He has undertaken critical reviews of upwards of 50 ES air quality chapters, including for numerous local authorities and for the Mayor of London. He has in-depth knowledge of road and rail emissions, having previously worked on relevant research projects at TRL on behalf of the European Commission, DfT, the then Highways Agency and local authorities. He involves himself in air quality policy, including previous policy development work for the Environmental Industries Commission, Defra, Mayor of London, BAA and local authorities. He has been a Member of the Institute of Air Quality Management and Member of the Institution of Environmental Sciences for more than a decade.
- 6.1.2 Richard Lane is a Principal Air Quality Consultant at Temple Group. He has ten years of experience in the environmental sector. Richard is involved with both road traffic and point source air dispersion modelling and assessment for major infrastructure and property development projects. He is involved in EIAs and writing ES chapters for infrastructure and property development projects, including HS2 and Barking Riverside. He is also involved with the production of standalone air quality assessments for planning applications in the UK. Richard has worked on air quality assessments for large rail projects within both urban and rural environments in the UK and is intimately familiar with the associated air quality issues. He also has an in-depth knowledge of local authority air quality requirements across the UK. He has been involved with several independent studies including a review of landfill methane emissions modelling, which was published by Defra, and more recently an economic assessment of technology options for tackling air pollution, which was published by the Environmental Industries Commission.
- 6.1.3 Marko Ristic-Smith is an Air Quality and Climate Change Consultant at Temple Group. He graduated with a BA (Hons) in Geography in 2015 and an MSc in Environmental Technology in 2016, specialising in environmental analysis and assessment. Marko has over three years' experience, covering all aspects of air quality assessment including dispersion modelling, construction dust risk assessment, air quality neutral assessment, odour assessment and monitoring, ambient air quality monitoring, indoor air quality monitoring, calculation of air quality damage costs, and preparation of dust management plans. Marko has conducted air quality assessment work in support of planning applications and EIAs for a range of proposed projects including residential, commercial and retail developments as well as major infrastructure projects. He is an associate member of the Institute of Environmental Science (IES) and the Institute of Air Quality Management (IAQM).

6.2 Review of existing ES and Addendums

Policy and regulations

- 6.2.1 Policy and regulations have been updated since submission of the 2014 ES. Some of these updates need to be accounted for in an air quality assessment. The following policy

and regulations need to be considered in Section 7.2 Planning Policy and Context of the 2014 ES.

National Planning Policy Framework and Planning Guidance

- 6.2.2 The revised National Planning Policy Framework (RNPPF) was published in July 2018², and updated in February 2019³. Paragraph 170 states:

“Planning policies and decisions should contribute to and enhance the natural and local environment by:

“e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions...”

- 6.2.3 Paragraph 181 states:

“Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.”

- 6.2.4 The Planning Practice Guidance (PPG)⁴ supports the NPPF and was first published online in 2014 and later updated in November 2019 to reflect changes to the NPPF. The PPG provides *“guidance principles on how planning can take into account the impact of new development on air quality”*. This guidance highlights the role of the local air quality management (LAQM) regime in pursuing national air quality objectives and its implications for planning. It also includes recommendations on how detailed an air quality assessment should be or how impacts on air quality can be mitigated.

Draft Rother District Council (RDC) Environment Strategy 2020-2030

- 6.2.5 RDC adopted its Environmental Strategy in September 2020⁵. The Strategy identifies air quality as an action plan priority, and outlines actions to improve air quality, including:
- implementation of car free or restricted vehicular access schemes;

² National Planning Policy Framework (July 2018), DCLG.

³ National Planning Policy Framework (February 2019), DCLG.

⁴ Planning Practice Guidance (PPG) – Air Quality, (November 2019), DCLG. Online guidance available at: <https://www.gov.uk/guidance/air-quality--3>.

⁵ RDC (2020) Environment Strategy 2020-2030, Bexhill-on-Sea, Rother District Council.

- requiring electric vehicle charging points and cycle parking as part of future planning policy;
- incentivising uptake of electric vehicles in the taxi fleet; and
- exploring options for partners and contractors to switch from diesel to electric vehicles.

Methodology and best practice

Construction Dust Risk Assessment

- 6.2.6 The construction dust risk assessment in the 2014 ES was completed in line with IAQM guidance issued in 2012. This guidance has since been updated⁶. Despite this update, the outcome of the construction dust risk assessment remains valid. However, the new guidance introduces a different suite of measures for mitigating construction dust impacts. The Construction Environmental Management Plan (CEMP) for the Proposed Scheme should therefore reflect the updated guidance rather than the mitigation measures defined in the 2014 ES, Volume 2. Preparation of a CEMP forms Condition 6 of the existing planning consent for the Proposed Scheme (RR/2014/1608/P)- see Chapter 18: Monitoring.

Operational Traffic Screening Criteria

- 6.2.7 The previous air quality assessment in the 2014 ES, Volume 2 screened the Proposed Scheme for a detailed dispersion modelling study against screening criteria defined in the DMRB⁷. Since the assessment was completed, the DMRB has been updated. The updated guidance⁸ states that a detailed assessment is required where any of the following changes are observed as a result of the operation of a scheme:
- Annual average daily traffic (AADT) of 1,000 or more;
 - Heavy duty vehicle (HDV) AADT of 200 or more;
 - A change in speed band; or
 - A change in carriageway alignment by 5 m or more.
- 6.2.8 These updated screening criteria, with the exception of speed bands, are the same as those in the previous iteration of the DMRB guidance and those used in the previous assessment. None of the DMRB criteria from either the old or the new guidance are triggered by the Proposed Scheme.

⁶ Holman et al. (2014) IAQM Guidance on the Assessment of Dust from Demolition and Construction v1.1. IAQM, London.

⁷ The Highways Agency (2007) Design Manual for Roads and Bridges, Volume 11, Environmental Assessment: Section 3: Environmental Assessment Techniques, Part 1, LA105 Air Quality.

⁸ Highways England (2019) Design Manual for Roads and Bridges: Sustainability & Environment Appraisal – LA105 Air Quality.

Baseline

- 6.2.9 The baseline assessment of the 2014 ES, Volume 2 needs to be updated to include more recent data sources. More recent local monitoring data are available, and pollutant background concentrations have been updated since the original 2014 ES.
- 6.2.10 The following local monitoring data needs to be considered:
- 6.2.11 RDC completed its first statutory review and assessment of air quality in 2000. This assessment concluded that air quality objectives were met throughout the District. The most recent Annual Status Report (ASR) available at the time of writing confirmed that the air quality objectives continue to be met throughout the District. There are no AQMAs designated in the District.
- 6.2.12 RDC undertakes continuous monitoring at two locations within its area. Of these, only the De La Warr Road kerbside monitoring site measures NO₂ and PM₁₀. **Table 6.1** shows monitoring results from the De La Warr Road monitoring site. At the time of writing this report, RDC had not published data for 2019 and 2020.

Table 6.1 Monitoring results for De La Warr Road monitoring location

Year	Annual mean NO ₂ (µg/m ³)	No of 1-hour exceedances NO ₂ ⁹	Annual mean PM ₁₀ (µg/m ³) ¹⁰	No of 24-hour exceedances PM ₁₀ ¹¹	Annual mean PM _{2.5} (µg/m ³)
2014	22.5	0 (105)	19.0	0 (30)	13.3
2015	19.8	0 (100)	24.3	2 (33)	17.0
2016	25.2	0	18.1	0 (27)	12.7
2017	21.8	0	21.4	4	15.0
2018	20.1	0	21.4	6	15.0
Objective	40.0	18	40.0	35	25.0

Source: RDC (2019) 2019 Air Quality Annual Status Report (ASR), Bexhill-on-Sea, Rother District Council

- 6.2.13 Additionally, RDC carries out NO₂ monitoring at a number of locations throughout the District using diffusion tubes. The majority of these are located at kerbside and busy roadside locations. The monitoring results indicate that the AQO for NO₂ has been met across the District in recent years.
- 6.2.14 In 2018, 22 diffusion tubes were used to monitor NO₂ concentrations within the District. The highest concentration of NO₂ monitored during 2018 was measured at location DT21 at Rye South Undercliff (36.8 µg/m³) which is 18 km southeast of the Proposed Scheme.
- 6.2.15 The following pollutant background concentrations need to be considered:

⁹ Data capture less than 85%. 99.8th percentile of one-hour mean NO₂ concentrations (µg/m³) included in brackets (where available). A 99.8th percentile concentration (in brackets) below 200 µg/m³ indicates compliance with the one-hour objective.

¹⁰ Data capture less than 75%, annual mean PM₁₀ concentrations have been annualised.

¹¹ Data capture less than 85%. 90.4th percentile of 24-hour mean PM₁₀ concentrations (µg/m³) included in brackets (where available). A 90.4th percentile concentration (in brackets) below 50 µg/m³ indicates compliance with the 24-hour objective.

6.2.16 Background concentrations of NO_x, NO₂, PM₁₀ and PM_{2.5} were obtained from the UK Air Quality Archive¹² for the 1 km x 1 km grid square centred on the following OS co-ordinates, covering the length of the proposed new rail line:

- 573500, 124500;
- 574500, 124500;
- 575500, 124500;
- 575500, 123500;
- 576500, 123500;
- 576500, 124500; and
- 577500, 124500.

6.2.17 These background maps are available for each year up to 2030. Background NO_x, NO₂, PM₁₀ and PM_{2.5} concentrations for 2020 (the earliest year of construction) and 2023 (the estimated operational year) are shown in **Table 6.2**.

Table 6.2 Background pollutant concentrations at the Proposed Scheme from the UK Air Quality Archive (µg/m³)

Pollutant	2020 (µg/m ³)	2023 (µg/m ³)	Objective
NO ₂	6.5 – 7.0	6.0 – 6.4	40.0
NO _x	8.3 – 9.0	7.6 – 8.2	N/A
PM ₁₀	12.4 – 13.8	11.9 – 13.2	40.0
PM _{2.5}	8.3 – 8.6	7.9 – 8.2	25.0

The range of values represents the range of values obtained for grid squares covering the length of the new rail line.

6.2.18 Local monitoring data and pollutant background concentrations displayed in **Table 6.1** and **Table 6.2** respectively are well below relevant air quality objectives (AQOs). This is consistent with the conclusions of the baseline assessment of the 2014 ES.

Changes to the Proposed Scheme design and construction

6.2.19 Changes to the Proposed Scheme since the 2014 ES and Addenda relate only to an increase in the extent of temporary land acquisition for the purposes of construction access. Construction phase air quality impacts will continue to be mitigated through the effective implementation of the Construction Environmental Management Plan.

6.3 Continued validity of assessment

Construction and Operational Traffic Air Quality Impacts

6.3.1 The 2014 ES assessment determined that the Proposed Scheme would not result in significant air quality impacts and that a detailed air quality assessment was not required, as the Proposed Scheme did not exceed the DMRB screening criteria. The latest information provided by I-Transport, the transport consultants on the Proposed Scheme, confirmed that the Proposed Scheme does not exceed the updated DMRB screening

¹² Defra Background mapping data for local authorities – 2018 <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>

criteria in Paragraph 6.2.7 during either the construction or operational phases. The conclusions of the previous assessment regarding air quality impacts associated with construction and operational traffic therefore remain valid.

Level Crossing Air Quality Assessment

- 6.3.2 Previously, emissions impacts associated with the queuing vehicles at new level crossings on Northbridge Street, the A21 and the B2244 were assessed¹³. Baseline emissions for the three roads were calculated based on predicted future traffic flows in the absence of the new level crossings. Emissions associated with queuing traffic at each level crossing were calculated based on traffic data available at the time.
- 6.3.3 Following additional transport assessment, longer crossing closure times have been assumed and updated traffic data have been provided for the proposed level crossing on the A21 by I-Transport. Emissions of NO_x and PM₁₀ have been calculated for the A21 level crossing following a similar method to that used in the previous assessment of traffic emissions at level crossings. Updates to the method are described below.
- A barrier closure time of 72 seconds was assumed. This is the higher closure time assumed in the updated traffic modelling. DfT traffic counts for 2019 were used, using growth factors provided by I-Transport.
 - The number of scheduled journeys in the train timetable varies from year to year. The 2018 timetable was used in preference to the 2020 timetable, for consistency with previous calculations and because there were more scheduled train journeys in 2018 than in 2020.
 - Updated A21 traffic data provide modelled queue lengths during peak 15-minute periods. Queue lengths in these peak periods are likely to be substantially longer than at other times. Using these queue lengths, therefore, provides a highly pessimistic estimate of additional emissions from queues on the A21.
- 6.3.4 **Table 6.3** and **Table 6.4** shows calculated increases in NO_x and emissions from the proposed level crossings. The predicted increase in NO_x and PM₁₀ emissions is below 2% on Northbridge Street and the B2244. The predicted increases in NO_x and PM₁₀ emissions on the A21 are 11.8% and 6.2 % respectively.

Table 6.3 Calculated NO_x emissions per unit distance in 2025 at proposed level crossings

Location	Baseline emissions (kg/km/annum)	Additional emissions from queues (kg/km/annum)	Increase in emissions as a result of proposed level crossing closures (%)
Northbridge Street	165.1	0.6	0.4
A21	1,193.4	126.2	10.6
B2244	408.0	6.9	1.7

¹³ Temple Group Ltd (2018) Track Reinstatement between Northbridge Street and Junction Road: Air Quality Statement – Level Crossings and Rolling Stock Emissions

Table 6.4 Calculated PM₁₀ emissions per unit distance in 2025 at proposed level crossings

Location	Baseline emissions (kg/km/annum)	Additional emissions from queues (kg/km/annum)	Increase in emissions as a result of proposed level crossing closures (%)
Northbridge Street	12.9	0.02	0.3
A21	98.6	3.42	5.6
B2244	31.9	0.24	1.2

- 6.3.5 Best practice guidance on assessing air quality for planning¹⁴ produced by Environmental Protection UK (EPUK) and the IAQM indicates that changes in pollution levels in areas with low concentrations are likely to be negligible if they are 5% or less. Air quality impacts on Northbridge Street and the B2244 are therefore considered negligible.
- 6.3.6 The predicted increase in NO_x and PM₁₀ on the A21 warrants further consideration. Updated traffic modelling shows that the queues in peak periods could stretch as far as the properties adjacent to the A21, north of the proposed level crossing.
- 6.3.7 A simplified calculation, using measured data from Rother District Council's diffusion tube site on the A21, suggests that a NO_x uplift of 10.6% could lead to an increase in NO₂ concentrations of 2.42µg/m³ one metre from the kerbside next to the level crossings, assuming 2018 emission rates. This would correspond to a 5.5% increase in annual mean NO₂ relative to the air quality assessment level of 40µg/m³. This is well below the level at which a moderate adverse impact might occur, given the low ambient concentrations. A moderate adverse impact, which might be considered to constitute a significant effect at a relevant receptor, would only be triggered by an increase in annual mean NO₂ of more than 4µg/m³.
- 6.3.8 A further simplified calculation, using the Defra NO₂ fall-off-with-distance calculator¹⁵, indicates that the increase in NO₂ at properties close to the A21 would be a maximum of 1.34 µg/m³. This level of increase corresponds to a negligible impact.
- 6.3.9 There is no PM₁₀ monitoring data in the vicinity, so a similar calculation cannot be undertaken. Percentage changes in PM₁₀ concentrations from the proposed level crossings will be far smaller than for NO₂, since PM₁₀ concentrations have larger background contributions.
- 6.3.10 As previously stated, the calculations above for the A21 are based on modelled queue lengths during peak 15-minute periods. Estimated increases in emissions are therefore highly pessimistic. Actual increases in emissions will be far smaller. It is considered, therefore, that queuing vehicles at the A21 level crossing will have a negligible impact on annual mean pollutant concentrations at the nearest sensitive receptors. In addition,

¹⁴ Moorcroft and Barrowcliffe, et al. (2017) Land-use Planning & Development Control: Planning for Air Quality v1.2. IAQM, London.

¹⁵ <https://iaqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>

considering the low baseline concentrations identified in the study area (**Table 6.1** and **Table 6.2**), there is no risk that annual or short-term air quality objectives will be breached. This conclusion is consistent with the findings of the previous assessment of level crossing air quality impacts.

Potential Impacts from Heritage Railway Steam and Diesel Engines

- 6.3.11 The previous assessment¹³ concluded that emissions from steam and diesel engines using the proposed extension would be well below the level at which significant effects might occur. This conclusion was reached based on the quantum of emissions and location of sensitive receptors. This conclusion is considered to remain valid for reasons explained below.
- 6.3.12 Defra technical guidance TG16¹⁶ provides guidance to local authority officers in support of their statutory air quality review and assessment duties. It is also commonly used in air quality assessments. Paragraphs 7.18 and 7.19 provide screening criteria for whether there is a risk that SO₂ and NO₂ air quality objectives may be breached.
- 6.3.13 For moving locomotives, the only screening criteria are for diesel locomotives, since Defra has established during the evolution of the local air quality management process that the risk from moving steam locomotives is minimal.
- 6.3.14 For context, the calculated 206 kg/km per annum for NO_x along the railway (a conservative over-estimate) in the previous assessment¹³ can be compared against 1,219 kg/km per annum of NO_x calculated above for the A21 in 2025. NO_x reacts in the atmosphere to form NO₂. Rother DC monitoring data show that NO₂ concentrations alongside the A21 are already well within air quality standards. NO_x emissions from the railway are more than five times lower than emissions from the A21 in 2025. NO_x emissions from the railway therefore pose no risk to achievement of air quality standards for NO₂. A quantitative assessment of the significance of railway NO_x emissions on NO₂ concentrations is considered neither necessary nor proportionate, given Defra guidance and the small quantum of NO_x emissions. Given the magnitude of NO_x emissions from the railway and location of receptors more than 20m from the line, it is considered that NO_x emissions from the railway will lead to negligible NO₂ impacts of negligible significance.
- 6.3.15 Given the small quantum of SO₂ emissions and Defra guidance on rail emissions, a quantitative assessment of SO₂ significance is not considered necessary or proportionate to the risk. Given the calculated emission rate, the location of receptors and the nature of the air quality objectives for SO₂, it is considered that SO₂ emissions from the railway will lead to negligible impacts of negligible significance.

Potential Impacts near the Proposed Engine Shed

- 6.3.16 The nearest relevant receptors for SO₂ air quality objectives near the proposed engine shed are a public right of way approximately 30 metres to the west and residential properties more than 150m to the south-south-west.
- 6.3.17 The previous assessment¹³ identified that the Great Central Railway (GCR) AQMA was declared due to occasional, short-term exposure to high levels of SO₂, when operations at the engine sheds and weather conditions combine to prevent adequate dispersion of

¹⁶ Defra (February 2018), *Local Air Quality management Technical Guidance (TG16)*

emissions. This is the only AQMA in the country designated in relation to heritage railway operations. It was also stated that the Great Central Railway engine shed was not considered representative of operations at the Rother Valley Railway because:

- the GCR operates full-size steam engines on the Great Central Railway; and
- residential properties are within 20m of the GCR engine sheds, around which the GCR AQMA is based.

6.3.18 Full-size steam engines (tender engines) running on the GCR are substantially larger than tank engines. They consume more fuel and therefore produce more pollutant emissions. The distances of receptors is also important. Pollution is dispersed rapidly with distance from a source.

6.3.19 Criteria in TG16 for determining the risk from stationary diesel or steam locomotives are as follows:

“Identify locations where diesel or steam locomotives are regularly (at least 3 times a day) stationary for periods of 15 minutes or more; and

“Determine relevant exposure within 15m of the locomotives.”

6.3.20 Further action is required only if these criteria are met.

6.3.21 In the proposed engine shed, steam locomotives will be stationary and firing up. There are no relevant receptors within 15m of the proposed engine shed. Emissions from within the proposed engine shed will also emerge primarily from the front of the shed, which is more than 50m from the nearest public right of way.

6.3.22 Given the criteria in TG16 for determining whether stationary locomotives may risk a breach of the SO₂ 15-minute air quality objective, that GCR operations and layout are not representative of the Rother Valley Railway proposals, that the nearest public right of way is approximately 30m from the engine shed at its closest approach and that residential receptors are more than 150m from the shed, a quantitative assessment of potential effects at receptors near the proposed engine shed is neither necessary nor proportionate to the risk. It is considered that there is not a risk that the SO₂ 15-minute objective (or any other SO₂ objective) will be breached because of the proposed engine shed and that any air quality impacts from the proposed engine shed will be negligible and of negligible significance. No mitigation or monitoring is considered necessary.

7.0 Landscape and Visual

The landscape review is located in Appendix B.

8.0 Ecology and Nature Conservation

8.1 Specialist experience

- 8.1.1 Giles Coe is an ecological consultant with 17 years commercial experience, a BSc in Environmental Management from the University of North London and full membership of the Chartered Institute for Ecology and Environmental Management (CIEEM). Giles is an Executive Director at The Ecology Consultancy. Giles has worked with Rother Valley Railway (RVR) in a consultative capacity since 2013.

8.2 Introduction

- 8.2.1 This chapter provides a narrative around the construction of the ecology section of the ES, explaining the drivers for key decisions, the context in which they were formulated and implications for future works. Additionally, a short summary of the key findings is provided in relation to the significant receptors considered as part of the impact assessment. No reference is made to statutory and non-statutory sites designated for their nature conservation interest, the ES scoped out all of these sites from the impact assessment as no significant effect was considered to be likely.
- 8.2.2 To provide some context to the consideration of the impacts and suitability of mitigation as presented within Environmental Statement, reference is made to key guidance and best practice documents covering ecology in construction and the planning system. Notably, the British Standard on Biodiversity (BS42020:2013) and Ecological Impact Assessment (EclA) guidelines published by the Chartered Institute for Ecology and Environmental Management (CIEEM) provide the best practice framework against which all planning submissions are to be assessed. In respect of the ecology chapter the original ES was informed by 2006 guidance from CIEEM, which was subsequently superseded in 2016 and then most recently in 2018.

8.3 Outline of the approach taken by the Environmental Statement

- 8.3.1 It is a fundamental principle of best practice EclA that assessment is founded on baseline conditions, determined through direct survey of any likely significant receptors scoped in at an earlier stage (CIEEM, 2006, 2016, 2018). For the ES to be as robust as practicable, given the dynamic nature of some receptors, surveys are best carried out as close to the date of the assessment as is practicable. Irrespective of the date that the original baseline was drawn it remains the case that by the time construction activities start, particularly for phased developments, that habitats will have matured further and species population status changed. For the key faunal receptors (dormouse, great crested newts) considered in the ES, although there may be flux in either direction through natural population dynamics and in reaction to stochastic events, absolute numbers are unlikely to change significantly over a 5 year period. Other species, such as badgers are more stable still, although a natural expansion in range and the establishment of new setts is to be expected.
- 8.3.2 Along much of the route of the proposed line re-opening, the habitats have been establishing since the line was closed in 1961 and the populations of the species resident along the route have had that 60 years in which to colonise and expand their range.

Where the rail embankment has been removed for farming the habitats are predominantly arable fields that likely have a lower intrinsic ecological value.

- 8.3.3 For this project, no direct land access was granted for the 3.4km route for the initial Phase 1 habitat survey or was permitted in order to carry out any Phase 2 surveys. Whilst guidance followed at the time (CIEEM, 2006) allowed for a simple Phase 1 survey to be completed for any adjacent land where access was not permitted (2.32, CIEEM, 2016), no published provision really allows for situations where zero access is the case.
- 8.3.4 The process of determining the value of receptors and likely impacts to them, and designing mitigation, compensation and enhancement measures to suit, falls away when it is not possible to access land to determine the baseline conditions. In the absence of data – although for other disciplines in the ES more can be done remotely to model current and future environmental conditions – little option remains for ecological receptors than to work with what information can be gathered which, by default, has been almost exclusively restricted to desk study, with habitats data augmented by remote viewing.
- 8.3.5 In the absence of direct information, it was wholly reasonable to determine broad habitat types through a combination of remote viewing and use of aerial photographs. It is similarly reasonable to use habitat type (along with other variables such as connectivity) as a determinant on which to base the presence or likely presence of important faunal receptors. All Environmental Statements rely to a greater or lesser extent on a precautionary approach to assessment, particularly where time may elapse prior to the start of construction activities. Compiling an ES that is predicated on assumptions due to lack of direct access is not without precedent. The ES for the first phase of HS2 works, did by necessity, follow a more precautionary approach and provided assumptions on the baseline for sections of the route where land access was strenuously refused. This is covered in the opinion from Russell Harris (2016) para 32-41:

“A recent practical example of an ES having been found to be legally sufficient in the absence of a full site survey of the relevant land in similar circumstances is provided by the passage of the HS2 Bill to date.

In that case, an ES was required by reason of the Directive referred to above and by reason of Parliamentary Standing Orders, to support the construction of HS2 by way of Parliamentary Bill.

Large sections of the proposed line were owned by objectors who did not allow access to the land for survey purposes.

The (RVR) ES recognised this fact and identified that informed desktop analysis would be used along with a precautionary approach of the type described above.

Parliament had to consider the acceptability of this approach as a matter of law and fact before accepting the Bill for consideration. On 17th December 2013 the promoter appeared before the Examiners of Private Bills. Proof was given, and accepted by the Examiners, that the ES contained the information required under the relevant Standing Order (27A). The

information required under standing Order 27A is the same as that required and set out above under the relevant regulations. There is no requirement for site surveys.

It follows that Parliament and its duly appointed officers (correctly) concluded that there was in HS 2 no requirement for site surveys along the whole length of the line.

In HS2 the areas of land which were not the subject of site survey were much more comprehensive than the areas concerned in the Rother case. Further, the potential impacts were much more severe and wide ranging.

The Railway's consultants (Temple) were well aware of the approach taken in HS2 because they were involved in that case and in the construction of an appropriately robust approach to land which was not surveyable.

- 8.3.6 The opinion provided by Russell Harris QC (2016) has in addition provided a clear and unambiguous argument that an ES can be compiled with "sufficient information" in place of site surveys (Harris, 2016 para 24-31)

"There is no requirement in the Regulations for detailed on site surveys to be undertaken as an essential part of an ES. Such a requirement could easily have been imposed if it was thought appropriate. It was not. The method of acquisition of information is not specified or required.

If a local planning authority is satisfied that it has sufficient information for the Environment Statement to properly be called an Environmental Statement having regard to Reg 2(1) and Schedule 4, then it can and should determine the application after considering such a statement and all other environmental information. This is the case even in the absence of a site survey.

The suggestion that a site survey is an essential part of any ES is simply incorrect as a matter of legal principle. Not only is it not an essential part of an ES, it is, for the reasons set out above not even legally "necessary". It is the reasonable sufficiency of the information and not its source or collection technique which is relevant.

In the absence of site surveys, I would however, expect the local planning authority to require detailed desk based analysis as well as aerial photographic analysis. I would also expect the compilers of an ES where there had been no on site survey to take an appropriately precautionary approach to the identification of interest and impact. This approach is specifically identified as appropriate where detailed factual material is not reasonably available in Environmental Impact Assessment 2nd Edition Tromans QC et al (chapter 4).

That is exactly what has been provided by the applicant in this case.

Further, this approach was specifically outlined and (correctly) accepted by the local planning authority as part of the scoping exercise. (see acceptance of scoping technique dated 17th January 2014)

Yet further, there has at no time been any Reg 22 request from the local planning authority indicating deficiency of information or seeking further information.

In my opinion, in these circumstances it would be both legally possible and legally reasonable for a local planning authority to conclude that an ES based on this information was sufficient to constitute part of an Environmental Statement for the purposes of the Regs. Indeed the suggestion now given the stance of the local planning authority to date that site surveys are a legally essential part of the process would seem to be contradictory and unreasonable”.

8.4 Mitigation hierarchy and the precautionary principle

8.4.1 As would have been the case if the baseline ecology data had been derived from site surveys as opposed to remote viewing and assumptions, the ES employed a precautionary approach to the assessment. In this instance, and in addition, assuming the presence (as opposed to absence) of protected species that could logically be present, and following the same principle, the ES erred on the side of larger rather than smaller populations. As cited above, the addendum then revised some of the assumptions previously provided to further extend this approach being mindful of concerns from consultees.

8.4.2 Further, the absence of detailed data has heightened the necessity that the ES would need to embody the principles behind the mitigation hierarchy – avoid, mitigate, compensate, enhance.

8.4.3 Paragraph 5.2 of the of BS42020:2013 states that:

The overarching aims of ecological work used to inform the planning process are to minimize harm and to maximize benefits for biodiversity resulting from development. The generally accepted way of doing this, now embedded within the planning system, is to follow the “mitigation hierarchy”. This seeks as a preference to avoid impacts then to mitigate unavoidable impacts, and, as a last resort, to compensate for unavoidable residual impacts that remain after avoidance and mitigation measures.

5.2.2 During the design stage the overall aim should be to prevent harm to existing biodiversity assets, delivering at least no net loss for biodiversity, and to deliver further benefits for biodiversity, i.e. a net gain, wherever possible. The mitigation hierarchy is a sequential process and each step in the hierarchy should be carefully considered in turn,

and incorporated into the design of the development (and checked by the decision-maker) before the next step is considered in light of any residual impacts not rectified by the previous step.

- 8.4.4 Avoid - In many development scenarios, the correct deployment of the hierarchy process is to consider what alternative designs or layouts could be followed with the objective of avoiding impact. For this project, the proposals could not deviate from the historic route in any significant way to avoid or minimise impact as by its nature the layout is predetermined, not just from the historic conditions but the need to join the track from the existing western and eastern extents. Whilst some adjustments may have been possible, additional constraints include the crossings over the Rother.
- 8.4.5 Mitigate – In applying the second stage and in accordance with BS42020 and EclA guideline, the scheme has sought to devise mitigation measures that would provide sufficient and enforceable mitigation on the assumed status of ecological receptors along the route (see following chapter). The solution proposed is predicated not on a worst case scenario but what might be considered to be likely in the knowledge of how certain receptors may be distributed along the route. Mitigation measures are by practise secured by way of relevant planning conditions and further by species licensing derogations.
- 8.4.6 Compensate – Where avoidance and mitigation measures are insufficient to rule out any residual impacts then appropriate and proportionate compensation measures have been designed into the scheme. These are largely achievable through the creation of new habitats along the route of the line where those habitats on the track-bed may require removal. As with mitigation measures these are captured within planning conditions and the requirements of species licensing regimes.
- 8.4.7 Enhance – Over and above the application of the preceding stages and in accordance with National planning policy

8.5 Summary of base-line data assumptions

- 8.5.1 The assumptions below were devised on the understanding that the ecology chapter would be re-drafted once 100% land access is allowed and all of the ecology surveys have been completed. This table is that presented in the original ES with some minor updates from the subsequent addendum, it is provided here solely for comparative purposes with the revised information pertinent to the Junction Road to Austen's Bridge section where ecological surveys and mitigation have since been completed and may influence assessment of the whole route.

Table 8.1 Baseline data assumptions

Assumptions of the presence/ absence and distribution of habitats and legally protected species based on their ecology and accepted habitat requirements- From 2014 ES ecology chapter with updates from later addendum		
Receptor	Assumptions of habitat classification type for impact assessment	
Phase 1 habitat survey	1.	Where access was permitted the on-site habitats were directly viewed and plant species recorded
	2.	Where no access was permitted the site was viewed remotely and the habitats were assessed to broad type
	a.	Grassland/pasture with homogenous structure and uniform colour of vivid green was taken to be Improved grassland
	b.	Grassland/pasture with diverse structure and variation in colour was taken to be Neutral Grassland/semi-improved
	c.	Visible evidence of recent crop, habitat taken to be Arable
	d.	Woodland assessed as Broadleaved/semi-natural unless conifers visible at distance
	e.	Blocks of shrub species less than 5m in height and less than 50% of the canopy, taken to be Scrub
Reptiles	f.	Any hedgerows, taken to be species rich and able to be classified as 'Important' under the hedgerow regulations
	3.	Freely available aerial photography was used to support the classification of remotely viewed habitats
	4.	Areas where reptiles judged to be present include all instances of; woodland edge, south-facing embankments, scrub/rough grassland mosaic,
Great crested newt	5.	Species likely to be present: adder, grass snake, slow worm and common lizard,
	6.	Population size, larger populations present in areas of greatest habitat complexity, where insolation is likely to be high and additional foraging resource available
	7.	A High population class size of great crested newts assumed to be present in all ponds within 500m of the route, including Ponds, 1, 2 and 3 all within the zone of impact
	8.	Great crested newts assumed to be present in all suitable terrestrial habitat within 500m of any pond
Dormouse	a.	Suitable terrestrial habitat includes: woodland, scrub, hedgerows, rough grassland
	9.	Assessment of possible meta populations based on perceived clustering of ponds
	10.	Presence assumed in all areas where habitat structure is suitable, includes:
Badger	a.	hedgerow with connectivity to woodland,
	b.	hedgerows in the footprint with connectivity to areas of woodland outside the buffer zone suitable for dormice;
	c.	connectivity to large (approximately 10ha) areas of woodland;
	d.	newly planted woodland with either stands of deciduous trees, or connectivity to areas of mature woodland; and
	e.	coniferous woodland with either stands of deciduous trees or connectivity to deciduous woodland.
	f.	Scrub and bramble
	11.	Any dormouse habitat within the historic route of the rail corridor will have established since the closure of the line
Water vole/ otter	12.	Hedgerows; density of 1.3 adult dormice per ha (Bright et al, 2008), woodland; 4-10 adults per ha (Bright et al, Dormouse Conservation Handbook 2nd edition)
	13.	Estimates of sett numbers based on PTES surveys of UK badger populations in 1997 for Arable II area = 0.3 to 0.4 setts per km ² . The addendum indicated this should rise to a minimum two main setts and multiple outlier setts
Breeding birds	14.	All sections of the route will be counted as suitable sett building habitat with higher value placed on sloping rail embankments
	15.	Presence unlikely within isolated farm ponds but assumed present along all sections of running water.
	16.	Water vole present at low population density of one female territory every 150m and two males to every female.
Bats	17.	Presence of one otter assumed along the River Rother that runs parallel with the route
	18.	It should be assumed that barn owl Tyto alba is likely to be present within and along the proposed route. The scheme should assume the presence of a wider suite of species, including but not limited to: barn owl (Schedule 1), kingfisher (Schedule 1), lapwing, meadow pipit and skylark.
Bats	19.	Wide assemblage of garden and woodland species assumed present within the proposed route
	20.	For the purposes of informing the site evaluation and impact assessment it is assumed that there will be one maternity roost of a widespread species and one satellite roosts of individual bats found in mature trees that will be lost to the scheme.
	21.	A single roost of individual bats of a widespread crevice dwelling species is assumed to be present in one of the bridges that cross the route
	22.	Based on the results of the data search and understood roosting requirements the species assumed to be roosting within the impact zone of the route are: brown long-eared <i>Plecotus auritus</i> , Daubenton's <i>Myotis daubentonii</i> and Natterer's <i>Myotis nattereri</i>

8.6 Ecology works 2017-2019

- 8.6.1 This chapter has been drafted to demonstrate that the ecological mitigation solution devised and enacted for the Junction Road to Austen's Bridge section was and is appropriate in terms of detail regarding survey, impact assessment and mitigation measures. The ecological works have been consistent with planning policy, consistent with the ES, have addressed the relevant planning conditions, and have been rigorous enough to allow Natural England to issue derogation consents for badgers and dormice. In addition, within this section I present new survey information relating to the scheme, how that relates to assumptions in the ES, and evidence of the habitat compensation and enhancement measures already completed.
- 8.6.2 The ecology works in the Junction Road to Austen's Bridge section provide an appropriate guide to that which will later be required for the remainder of the route, if and when access becomes available. The current works in this section also enabling a simple cross comparison between the assumptions in the ES and the actual data arising from the direct site surveys. The works to date in this section of the track, deliver a proportion of the mitigation, compensation and enhancement measures devised within the ES, thereby demonstrating both the practicality and the efficacy of the ecology proposals previously described. In demonstrating that such measures are practical and effective for this single section, this evidence provides proof that the remainder of the route can be delivered to the same best practise standards.
- 8.6.3 In regards ecological considerations, it is important to state that whilst this inquiry relates to the TWA application, the scheme does have planning consent, that each of the planning conditions relating to that consent have been signed off, that Natural England have already issued multiple consent licences for the scheme and that those licences have been fully enacted or are in the process of so being.
- 8.6.4 Planning permission was granted by Rother District Council with a decision date of 22 March 2017 and attached to that are four conditions relating to ecology, these are reproduced below in the relevant sections. In addition to direct ecology surveys being required under Condition 3, post planning documents were also produced to determine impact, mitigation and compensation measures, essentially replacing the function of an EclA or a revision of the ES ecology chapter. These new documents included a Landscape Ecological Management Plan (LEMP) for Condition 5, a Construction Environmental Management Plan (CEMP) for Condition 6, a Protected Species Plan (PSP) for Condition 7 and an Ecological Constraints and Opportunities Plan that cut across each of the above. The content, function and objective of these post planning documents are set out within BS42020 and should be viewed as descriptors of the best practice for biodiversity in construction.
- 8.6.5 This rest of this chapter is broken down into sections that cover the ecological works carried out as conditions of the planning permission for the scheme (paragraph 3.6) and the subsequent consent and mitigation measures implemented once those conditions were signed off by the LPA. Consented mitigation works comprising a European Protected Species Mitigation (EPSM) licence for dormice and a licence to allow the disturbance of badgers and their setts.

Post Planning - surveys

-
- 8.6.6 In regards the requirement to complete site surveys for valued ecological receptors, thereby replacing the assumptions within the 2014 ES (& addendum) the following pre-commencement condition was placed:
- 8.6.7 Ecology Survey Condition (3): No development shall take place until a further detailed site-specific ecological assessment, carried out by suitably qualified and experienced ecologists has been submitted to and approved in writing by the Local Planning Authority. The assessment must employ best practise and should include, but not be limited to:
- 8.6.8 Surveys of the proposed development site as well as its immediate surroundings
- 8.6.9 Identifying and evaluating existing ecological features including any key species, including protected species, invasive species and habitats
- 8.6.10 Precise recommendations for minimising negative impacts and maximising net biodiversity gains through habitat management, enhancement, creation of compensatory habitat and habitat restoration.
- 8.6.11 The surveying elements of Condition 3 were carried out primarily by CLM who completed surveys within the Junction Road Bodiam and Austen's Bridge section for: badgers, bats, dormice, great crested newts and reptiles. Those surveys identified that great crested newts were likely absent within the target section whilst the other species were all found to be present in differing population sizes and distributions.
- 8.6.12 **Badgers** – The CLM surveys were carried out in June and December 2017 following accepted methodology, those surveys identified the presence of six setts including one that met the published criteria to be classified as a Main sett. The latter describing a sett that is in year-round use and provides the main place of occupation for a single social group (or clan) of badgers.
- 8.6.13 In drafting the post planning documents (Section 3.3) it was felt necessary to re-survey the section of the line to obtain the greater level of detail required to devise the mitigation strategy. The second survey was carried out by suitably experienced ecologists from The Ecology Consultancy (Giles Coe, Rosanna Marston) in March 2018. That survey confirmed and then refined the original survey results, identifying four Outlier setts, one Annex and a Main sett all in either current or very recent occupation.
- 8.6.14 The addendum to the ES (RVR-28) provided an assumption that, throughout the length of the route, a total of two main setts and four outlier setts would be present. This does demonstrate that the original assumptions may not have been sufficiently precautionary and it may now be expected that an additional four> outlier setts and more than one additional main sett could be present along the route. The implications in this instance are that an additional main sett will result in a further territory for another badger clan that could be in competition for resources in the immediate area. To adjust for this change, once access for the whole route is possible, in addition to a standard presence/absence surveys for badger setts, a bait marking survey will be carried out with the aim of determining the exact territories for badger clans along the route. This additional information will allow a bespoke mitigation master plan to be developed, including the correct placement of any artificial compensation setts required.
- 8.6.15 **Bats** – Ecologists working on behalf of CLM carried out a series of emergence or dawn re-entry surveys in July, August and September 2017, surveyors being stationed at six

strategic listening points from Junction Rd to Austen's Bridge and walking between those points for the surveys which were three hours in duration. A minimum of four species were recorded, common pipistrelle, soprano pipistrelle, Daubenton's and a species from the myotis genus.

- 8.6.16 A maternity roost of was identified in a mature ash tree close to Junction Rd with 32 individuals recorded leaving during the July survey. CLM having recorded these bats as likely being from two species, soprano pipistrelle and Daubenton's. This roost is being retained and protected (see later sections).
- 8.6.17 Bats of all four species were observed to use this section of the site for foraging and commuting in July, pipistrelles only in August and Soprano pipistrelle and Daubenton's in September.
- 8.6.18 To augment these survey results and provide additional information for the post planning documentation a suitably experienced ecologist from The Ecology Consultancy (Bob Antonini) carried out a Ground Level Tree Roost Assessment in November 2018 (The Ecology Consultancy, 2019a). That survey identified one additional mature tree with high potential for a bat roost, nine with moderate potential and 12 with low potential.
- 8.6.19 The assumptions within the ES allowed for a total of one maternity and one satellite roost in trees that would be lost to development, that a roost of individual bats would be found with at least one bride or structure and that the species encountered would include brown long-eared, Daubenton's and Natterer's bats.
- 8.6.20 **Dormice** – Ecologists from CLM set-up and completed a dormouse nest tube survey of the section from Junction Rd to Austen's Bridge between June and December 2017, using 50 artificial nest tubes and a survey effort equating to a probability index score of 20. The survey followed standard methodology for this species (Bright et al. (2006) & Chanin & Gubert (2011)).
- 8.6.21 Using the survey data collected along with a calculation of the area of suitable habitat available and that which may be impacted by the proposals and estimate was later calculated to help determine likely population size. This is reproduced below as an extract from the dormouse EPSM licence method statement (The Ecology Consultancy, 2019b).

Total habitat suitable for dormice within the site covered approximately 1.638ha. The Dormouse Conservation Handbook (Bright et al, 2006) states that optimal habitat (diverse deciduous woodland with abundant scrub and vigorous understorey) can support a mean spring density of 4 to 10 individuals per ha. The density for scrub habitat is unknown but would be no more than for optimal habitat. An estimate of the maximum number of dormouse present on site and within each habitat is given below:

- dense bramble scrub 0.132ha x 10 = 1.32 individuals*
- broadleaved semi-natural woodland 1.506 ha x 10 = 15.06 individuals*

Total number of dormouse present likely to be present within the site boundaries = 17 individuals (16.38)

- 8.6.22 The ES assumed the presence of dormouse within all habitats with suitable structure and a density of 1.3 adults per ha in hedgerows and 4-10 adults per ha in woodland.

- 8.6.23 **Great crested newts** – Licensed ecologists from CLM calculated Habitat Suitability Index (HSI) and then subsequently carried out eDNA sampling surveys of two ponds in June 2017. Both ponds were within 500m of the Junction Road to Austen's Bridge works area, 220m and 400m south respectively. Following the HSI calculation, Pond 1 had an Average probability of presence and Pond 2 a Good probability although the eDNA results were negative for both ponds. The ditches that run at the foot of the embankments to either side of the rail line were not considered suitable due to regular desiccation observed throughout the year.
- 8.6.24 The ES was predicated on the assumption that there would be a Large population class size (over 100) in each pond that falls within 500m of the route. By implication, great crested newts being present within any on-site habitat that fall within a 500m buffer of each pond.
- 8.6.25 **Reptiles** – Ecologists from CLM carried out a series of surveys to assess the presence and distribution of reptiles within and adjacent to the Junction Road to Austen's Bridge section. Those surveys were carried out across 20 survey visits from late June to late September 2017. Survey refugia generally targeted the more open habitats either side of the site margins rather than the more poorly insolate central track area.
- 8.6.26 The surveys identified very low peak counts (1-2 individuals) of common lizard and grass snake which were recorded adjacent to and not within the construction footprint.
- 8.6.27 The ES assumed the presence of adder, grass snake, slow worm and common lizard within suitable areas such as woodland edge and scrub/rough grassland mosaic with larger populations assumed present where insolation was considered likely to be high. For the section concerned this included the entrance by Junction Road, Austen's Bridge area and a small section of track where aerial imagery suggested a more open canopy.
- 8.6.28 **Schedule 1 birds** - No dedicated surveys for Schedule 1 were carried out prior to planning being granted. The text below is reproduced from an additional information document submitted to the LPA (The Ecology Consultancy, 2019a).
- "The Environmental Statement Addendum (November 2016) stated that a wider suite of birds than originally assumed is likely to be present, including some listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). However, the entire length of the proposed route to which the Environmental Statement Addendum refers to is made up of a more diverse number of habitats than the site itself (Junction Road to Austen's Bridge), which consists nearly entirely of scrub and secondary woodland habitats. These habitats are considered largely unsuitable for any Schedule 1 species that might occur (see below). For these reasons, it was not deemed necessary to undertake breeding bird surveys, on the assumption that a range of common bird species would be present".*
- 8.6.29 In place of any dedicated surveys and to provide additional information and assurance an ornithologist from The Ecology Consultancy (Principal Ecologist - Bob Antonini) visited the site in November 2018 (The Ecology Consultancy, 2019a) to further assess the habitat suitability for Schedule 1 species. That assessment found a single tree with suitability for barn owl, that tree was off the main embankment and not a under threat from works. The main habitats within the site were not assessed as having more than Low value to nightingale, due to over-shading and poorly developed scrub cover.

- 8.6.30 Other Schedule 1 birds – The supplementary information for planning also considered other schedule 1 birds, as did the ES addendum.

“The Environmental Statement Addendum (November 2016) states that a wider suite of birds than barn owl should be assumed present along the proposed route including kingfisher Alcedo atthis (Schedule 1), lapwing Vanellus vanellus, meadow pipit Anthus pratensis and skylark Alauda arvensis. The proposed route is made up of a more diverse number of habitats than the site (Junction Road to Austen’s Bridge) however, which consists nearly entirely of scrub and woodland habitats. These would not typically support breeding kingfisher, lapwing, meadow pipit or skylark”.

Post Planning - Documents

- 8.6.31 As described above, a series of four key documents were produced by The Ecology Consultancy on behalf of RVR to provide sufficient information with which to acquit the relevant planning conditions, and to guide the next phases of works in the Junction Road to Austen’s Bridge section of the track. Each of these documents, whilst seemingly similar in content, has a distinct function and role to play in the control and management of biodiversity interests in construction environments at different stages of the programme.
- 8.6.32 **Protected Species Plan (PSP)** (The Ecology Consultancy, 2019c) – The function of this document is to layout the ecological principles that underpin the Construction and Environment Management Plan (CEMP) and the Landscape and Ecology Management Plan (LEMP). Within the project life cycle the Protected Species Plan (PSP) can be drafted either pre or post the grant of planning permission, but after the relevant ecology surveys have been completed.
- 8.6.33 The PSP is required to discharge planning condition number 7 (Application Number RR/2014/1608/P) issued by Rother District Council as below:
- “In the event that the further site-specific assessment, including survey, referred to in condition 3 identifies populations of any protected species, no development shall take place until a plan detailing the protection and/or mitigation of damage to the population(s) has been submitted to and approved in writing by the Local Planning Authority. The plan shall be implemented as approved.”*
- 8.6.34 This document was used to set out the conservation objectives of the mitigation solution in relation to the survey results, identifying what were determined to be the key ecological receptors for the site. There is a great deal of cross over with the subsequent CEMP and LEMP documents although the latter two both provide the finer detail for the principal components of the strategy. Whether explicit or implicit this document is used to illustrate the process that was followed in adherence to the mitigation hierarchy. This is ably demonstrated by the Ecological Constraints and Opportunities Plan which illustrates the key constraints to be avoided, where mitigation is required and the location of compensation and enhancement measures.
- 8.6.35 **Construction Environment Management Plan – Biodiversity** (The Ecology Consultancy, 2019d) – The function of this document is to ensure that any adverse impacts from the proposed construction methods are adequately mitigated for. Within the project life cycle the CEMP guides solely enabling and construction activities and replaces that part of the ES process that describes the compensations measures, albeit with a greater level of detail.

8.6.36 Requested and acquitted under Condition 6 which states:

No development shall take place until a construction environmental management plan (CEMP) that is in accordance with the approach outlined in the submitted Environmental Statement, has been submitted to and approved in writing by the Local Planning Authority. Such plan shall be carried out by suitably qualified and experienced persons/bodies and shall deal with the treatment of any environmentally sensitive areas, their aftercare and maintenance as well as detailing how the environment will be protected during the works. The CEMP shall include details of the following:

- the timing of the works including timings to avoid harm to environmentally sensitive areas or features and the times when specialist ecologists need to be present on site to oversee works;*
- the measures to be used during the development in order to minimise environmental impact of the works;*
- the ecological enhancements as mitigation for the loss of any habitat resulting from the development;*
- a map or plan showing habitat areas including the river buffer zone to be protected during the works with proposed means of protection.*
- any necessary mitigation for protected species;*
- a detailed method statement for removing or the long-term management / control of invasive non-native species;*
- construction methods and a risk assessment of potentially damaging construction activities; and all necessary pollution prevention methods.*

8.6.37 As described above, the CEMP is designed to guide all the envisioned construction activities, providing a risk assessment (a de-facto impact assessment) for each of the expected ecological receptors against each of the likely activities. This effectively replaces the function of the ES to assess impact and provide mitigation measures which are then illustrated using maps and tables with the text presenting detailed bespoke methodology.

8.6.38 The CEMP is a practical guide for ecologists and construction workers with an accompanying timetable of ecology works and assigning responsibilities for key people involved in the project. The timetable in the CEMP was later superseded (The Ecology Consultancy, 2019e) when works were delayed, being updated to move some of the habitat creation to 2020 along with the closure of the main badger sett and final removal of tree stumps as dormouse mitigation. This is entirely consistent with adjusting mitigation measures to adapt to changing ecological conditions and/or an adjusted construction schedule.

8.6.39 The receptors covered in the CEMP include; habitats, badgers, bats, breeding birds, dormouse and reptiles with the construction activities listed as; site clearance, site mobilisation and final construction. The CEMP utilises the concept of Biodiversity Protection Zones which for the Junction Road to Austen Bridge section provided the detailed mitigation measures for the above listed ecological receptors.

8.6.40 **Landscape and Ecological Management Plan** (The Ecology Consultancy, 2019f) – The function of this document is to ensure that any habitat creation measures are those that are most appropriate to the situation, are practicable and can be managed appropriately to the benefit of biodiversity in general and key receptors in particular. Within the project lifecycle the timing of its implementation is often post construction but may take place prior to construction where habitats are needed to mature earlier as compensation for loss of habitats during enabling.

8.6.41 This document was requested and acquitted under Condition 5 which states:

“Ecology Management Condition; No development shall take place until a Landscape and ecology management plan and monitoring strategy, including long-term design objectives management responsibilities and maintenance schedules and a timetable for implementation has been submitted to and approved in writing by the Local Planning Authority. The plan must deliver the recommendations of the approved site-specific ecological surveys carried out in accordance with condition 3 and contain details of:

- *the extent and type of any new planting (for example native species of local provenance)*
- *maintenance regimes*
- *any new habitat created on site*
- *management responsibilities.*

The management plan and monitoring strategy shall be implemented as approved”

8.6.42 The document that covered this condition was submitted in August 2019 (The Ecology Consultancy) and within it was set out the design objectives for the Junction Road to Austen’s Bridge section. This approach being predicated on the management of on-site habitats for the benefit of the habitats themselves, but primarily targeted towards dormice which are the key species in this section.

8.6.43 The key measures recommended include the enhancement of retained habitats and the creation of new habitats (details below) along the existing rail corridor to the north-east of the site and the far side of Junction Road. Additionally, both bird and dormouse boxes were to be installed and monitored along with log-pile creation to benefit reptiles. A simple management plan was provided to run up to 2023.

Status of relevant planning conditions

8.6.44 To discharge the planning conditions listed above, Condition 3 - survey, 5 - LEMP, 6 – CEMP and 7- PSP, the relevant documents were submitted to Rother District Council in a series of iterations in 2018 and 2019. This included the original survey reports from CLM, the additional ecological information report (The Ecology Consultancy, 2019a), the CEMP, LEMP and PSP.

8.6.45 Rother District Council confirmed that the information submitted was approved as suitable to discharge the relevant conditions on 9 April 2019. A specific note was provided to confirm that the ecological consultants will consult with the Sussex Ornithological Society (SOS) in regards any important areas elsewhere on the route for schedule 1 bird species.

8.7 Implemented mitigation measures

- 8.7.1 **Badgers** – Following on from the requirements for badger mitigation laid out in the CEMP, ecologists from The Ecology Consultancy carried out a more detailed assessment of the badger setts on the site. The objective was to refine the mitigation strategy in light of the complexities caused by potentially conflicting mitigation schedules for badgers and dormice.
- 8.7.2 It was decided to proceed with the closure of the badger setts phased over two years, with the two outlier setts mid-way along the track route to be closed in 2019 and the remainder of the setts in 2020. To facilitate this process an extensive new artificial sett was created where sufficient space allowed within the CESS to the south of the rail embankment. The sett was constructed to the dimensions and design criteria that is specified in Natural England's standing advice note and completed under the guidance of an ecologist as per the CEMP. The entrances to the sett were kept closed off using plywood to be opened closer to the closure of the main sett in 2020. Due to the poor drainage locally and the situation of the site within a flood plain an additional drainage pipe was installed longitudinally beneath the sett.
- 8.7.3 An updated survey plan (The Ecology Consultancy, 2019g) and a site registration form were submitted to Natural England under the Badger Class Licence scheme. The accompanying email (The Ecology Consultancy, 2019h) laid out the concurrent constraints for dormice and the timetable for closure of the other badger setts. Natural England subsequently confirmed that the site was registered on the scheme on October 7th 2019 (Natural England, 2019a) and that disturbing works could proceed.
- 8.7.4 The sett closure process as described in the CEMP was then carried out under my direct and active supervision. It was assessed that badgers were likely absent from Sett 1 but the exclusion and proofing measures were applied as a precaution and to prevent badgers that would be displaced from Sett 2 from occupying it. The exclusion process proceeded according to the plan and the two setts were excavated in their entirety and subsequently destroyed in early November 2019.
- 8.7.5 The artificial sett was subsequently opened in March 2020 trail cameras were installed at each of the opened entrances which were baited using a mixture of molasses, peanuts and oats with bedding (hay) also left outside the open tunnel entrances. On 1 April, within 9 days of opening the sett, badgers were filmed coming in and out of the entrances. Monitoring and re-baiting continued, and the badgers were filmed taking bedding materials into the chambers on 19 April 2020.
- 8.7.6 A derogation licence to disturb badgers for reason of development was granted by Natural England on July 1 2020 to cover the closure of the three remaining setts along the Junction Road to Austen's Bridge section. The licence was then enacted in the last week of July with the full week required taken to install all necessary exclusion measures across the three setts and for all areas of exposed track and embankment between the setts. All the installed one-way gates across each sett were set to one way operation at the same time. Monitoring started the following Monday August 3rd.
- 8.7.7 Concurrently with the monitoring of the excluded setts trail cameras were set up outside the artificial sett to determine the uptake by badgers displaced by the sett closures. This exercise provided evidence that badgers started occupying the new sett from 3

September onwards with video footage recorded in 13 out of the 15 monitoring visits conducted afterwards.

- 8.7.8 Monitoring of the excluded setts continued until the start of the sett closure process which started on the 5 October and completed on the 9 October. All setts were effectively destroyed in this period with the formation of the new track-bed taking place immediately afterwards.
- 8.7.9 It should be noted that prior to 2020 survey and mitigation works the entire length of the Junction Road to Austen's Bridge section of the track was subject to significant flooding (see Photo x) on three occasions in January and February 2020. This flooding caused the abandonment of the remaining badger setts due to the inundation of flood waters into each entrance of each sett (see Photo x). The artificial sett being similarly affected although to a slightly lesser degree as it sits slightly higher above ground water level with entrances on a slight incline up. There was evidence that badgers had re-occupied each of the setts within a few days of the flood waters subsiding.
- 8.7.10 **Bats** – As described above (3.11) there is a maternity colony of bats that occupies an over-mature ash tree close to the site entrance by Junction Road. As per the details provided in the CEMP the area round this roost (CEMP page 11, Biodiversity Protection Zone Map) was kept clear of any construction activities during the initial site clearance/enabling works. In addition a protective and long-term chestnut pale fencing barrier was installed around this tree to prevent any accidental damage or disturbance (see Photo x).
- 8.7.11 As per the additional ecological information report (The Ecology Consultancy, 2019a) no trees with moderate to high bat roost potential were required to be felled. Any trees with low potential were felled following best practice guidance.
- 8.7.12 **Breeding birds** – Due to the restrictions of the dormouse EPSM licence (see below) the removal of habitats along the rail embankment could only start in May which is within the bird nesting season. This is an unavoidable result of the need to constrain the removal of dormouse habitats to avoid their hibernation season. The scheme's ecologist implemented the mitigation measures provided in the CEMP with experienced ornithologists carrying out daily surveys for any bird nesting activity and an ECoW checking for nests (and dormice) during the clearance.
- 8.7.13 No nests were suspected or encountered until 50% of the vegetation clearance had been completed, there were three nests located within scrub habitats in the western end of the middle section of track. As per the CEMP an exclusion zone was set-up and works constrained outside of that area until monitoring had demonstrated that the young had fully fledged.
- 8.7.14 **Dormouse** – On planning being granted and the relevant conditions had been signed off by the LPA an application for a dormouse European Protected Species Mitigation (EPSM) licence was submitted to Natural England and subsequently granted in May 2019 (Licence numbered 2019-40620-EPS-MIT). The format of the EPSM licence requires an impact assessment to be completed, this is in far greater detail than would ever be carried out within an ES. Assessing population size (value), exact extents of vegetation to be lost or disturbed, the type of impact at different scales, the numbers of individual dormice likely to be directly impacted and the extents of compensation habitat to be created.

- 8.7.15 Prior to the start of the vegetation clearance enacted under the licence the 50 dormouse boxes required under both the CEMP and the licence were installed across the site in suitable habitat to be retained. The original licence application was submitted on the basis of a single phase, progressive vegetation cut, with a section at a time cleared in their entirety under the supervision of an ECoW/accredited dormouse handler. All of the tree roots being removed at the end point and also under an ECoW.
- 8.7.16 Due to the density of scrub growth into and around the main badger sett, the subsidiary sett and two of the outliers, and the time taken to clear preceding sections it would not have been practicable to complete the final phase of vegetation removal in this area prior to those setts being closed. This is due to sequencing difficulties, including the need for the artificial sett to have been completed and located by the badgers prior to the closure of the main sett and the onset of the dormouse breeding season. Therefore the implementation timeline was:
- Submit dormouse licence April 2019;
 - Licence granted May 2019;
 - Clear woodland habitats progressively but in a single stage cut the under the dormouse EPSM May – June 2019;
 - Stop clearance work end of June 2019, due to beginning of dormouse breeding season and reaching the annex and main badger setts;
 - Amend dormouse licence and re-submit August 2019 to clear remaining habitat;
 - Re-commence but as a two-stage dormouse clearance October – November 2019, around the area of the remaining badger setts (outside dormouse and badger breeding season; and
 - Final vegetation removal down to ground level and removal of stumps to run concurrently with the closure of the badger setts from July 2020 onwards.
- 8.7.17 Dormouse monitoring carried out in November and December returned positive records for five of the 50 new nest boxes. These results can be interpreted as demonstrating that the dormice within the works area have been successfully displaced into adjacent retained habitats.
- 8.7.18 It should be noted that the flood events noted above will have on the balance of probabilities cause the mortality of any hibernating dormice in the areas where vegetation was retained around the main and subsidiary badger setts. Dormice hibernate at ground level in leaf litter and other similar habitat and the land either side of the rail embankment along the entirety of its length were flooded to a depth of approx. 1.5m with localised flooding also covering most of the top of the embankment as well.
- 8.7.19 A requirement of the dormouse licence was for twice yearly monitoring of the 40 nesting boxes installed as part of the mitigation for this species, this monitoring is now in its second year and due to continue until the end of the active season in 2024.
- 8.7.20 **Reptiles** – As per the instructions in the CEMP and survey reports, reptiles were considered to be likely absent from the vegetation clearance area. The vegetation was cleared using hand tools and under an ECoW and any reptiles that may have been

present are highly likely to have dispersed during this process. None were observed by the ECoW.

8.8 Implemented and planned compensation measures

8.8.1 The following habitats have been created as part of the requirements of the dormouse EPSM licence, the CEMP and the LEMP. The location of these planting areas is illustrated in both of the above documents and also the supporting maps for the licence itself.

8.8.2 Scale of loss - Habitat with potential to support dormouse within the Junction Road to Austen's Bridge section comprised the following: 1.506ha of broadleaved semi-natural woodland, 0.132ha of dense bramble scrub = 1.638ha, of this 0.527ha was calculated as a permanent loss. The compensations measures were two fold; 1) new habitats created and managed off site (further east along the current rail line). 2) the enhancement and management of retained habitats. There is projected to be a net gain with the completion of the Junction Road to Austen's Bridge section planting.

Completed

8.8.3 The details below are an extract from the dormouse EPSM licence (as amended) and were implemented by the Rother Valley Railway team over the winter of 2019. This implementation has been confirmed by the author on a site visit in February 2020. The location of these new habitats is illustrated in Figures E3B and E4B (The Ecology Consultancy, 2019i/j), the text below is an extract from the EPSM method statement;

"To compensate for habitat loss on site, an area of 0.598ha of mixed native scrub and trees will be planted along the railway corridor approximately 450m north-east of the site (refer Figure E3b). Planting will comprise a mix of species with recognised value to dormice (Bright et al, 2006) including oak (10%), hornbeam (15%), hazel (10%), hawthorn (30%), blackthorn (30%) and honeysuckle (5%). All plants will be of local provenance where possible. The new planted areas will comprise a higher diversity of species than is currently present on the site within the scrub and secondary woodland and will also increase the proportion of species providing food for dormice such as hazel and honeysuckle."

"To mitigate for the temporary loss of nesting sites and enable long term monitoring of the site 40 (N.B. 50 boxes were actually installed as per the CEMP) dormouse boxes will be installed at 15-20m intervals within woodland along the northern and southern site boundaries (refer Figure E3a). Boxes will be installed in May 2019 so that they are in place before habitat clearance takes place."

8.8.4 The details below are again extracted from the dormouse EPSM and provide the details of the habitat enhancement measures implemented in winter 2020/21 post the completion of the track construction in this section.

"Retained woodland measuring 1.118ha located along the northern and southern boundaries of the site will be enhanced for dormice with new scrub planting in the gaps (10% of the area) equating to new habitat creation of 0.112ha (refer Woodland Management Plan). The following mitigation measures are proposed as part of the habitat creation and enhancements (refer Figure E3a) and include:

- *A new woodland understorey to be created by planting a mosaic of scrub species.*

- *New scrub planting to total habitat creation of 0.112ha. Species composition will comprise 17% bramble, 17% blackthorn, 17% Guelder Rose, 17% hazel, 17% honeysuckle and 17% hawthorn.*
- *Scrub understorey to provide a rich food resource for dormice year round.*
- *New planting and woodland to be managed for five years in line with measures set out within the Woodland Management Plan (refer Figure E4b).*
- *Habitat enhancement will be undertaken November 2020 once the track works have been finalised (to prevent damaged to the new planting)."*

Comparison with ES

- 8.8.5 The ecology chapter of the ES set out targets for the creation of broadleaved woodland and scrub for the entirety of the scheme to be planted both in linear strips alongside the rail line and also a proportion within adjacent arable fields. These were stated in the previous chapter but repeated here for ease of comparison.
- Broadleaved woodland: 1.5ha alongside the line
 - Broadleaved woodland: 1.5ha in a single block
 - Scrub: 1ha alongside the line.
- 8.8.6 Within just the Austen's Bride section scrub planting is currently a little in excess of 50% of that proposed for the whole of the scheme, whilst the woodland enhancement measures are a little under 1/10 of the whole scheme.

8.9 Continued validity of assessment

- 8.9.1 As referenced in the preceding section in respect of the ecology chapter the 2014 ES was informed by 2006 guidance from CIEEM, which was subsequently superseded in 2016 and then most recently in 2018. This includes changes in respect of the age and validity of data used in assessments, however, as the ES was predicated on assumptions any potential material differences consequently fall away. Additional changes include references to the introduction and use of Biodiversity Net Gain to be embedded within the scoping and assessment process.
- 8.9.2 In regards the assessment within the ES regarding the likely presence, distribution and abundance of legally protected species and subsequent empirical evidence from surveys along the Junction Rad to Austen's Bridge section, the following observations can be made.
- 8.9.3 **Bats** – confirmation that at least two of the assumed species (Daubenton's and soprano pipistrelle) are indeed present but the roosts are of greater conservation significance, however, no impact to these roosts is currently predicted.
- 8.9.4 **Badgers** – due to the density and frequency of setts located within the Junction Road to Austen's Bridge section there is a revised estimate of at least one additional main sett and subsequently additional territory than the revised addendum. At minimum of three main setts estimated along the length of the route with greatest likelihood of occurrence in woodland in the eastern half and the short section of woodland below Salehurst.

- 8.9.5 **Dormouse** – utilising the survey data for Junction Road to Austen’s Bridge section the ES assessment of 1.3 adults per hectare in hedgerows and scrub is supported whilst the current estimate for woodland occupancy is revised upwards by an additional 7 adults to an assumed density of 17 per hectare.
- 8.9.6 **Great crested newts** – whilst the ES assumed presence within all ponds the subsequent eDNA surveys in 2017 demonstrated absence in two ponds in the area of Junction Road. The implications are therefore that the precautionary assumed presence of a high population in all ponds within 500m metres must be revised downwards.
- 8.9.7 **Reptiles** – surveys have so far only identified very small populations of two species of reptile although in a section not anticipated to have a particularly high density.
- 8.9.8 **Schedule 1 birds** – no change to the assessment from the assumptions in the revised addendum.
- 8.9.9 **Habitats** -whilst there will have been a maturing of the habitats known or assumed to be along the route, any changes from the intervening 7-8 years are unlikely to make any material difference to the assessment over what has been a relatively short period.
- 8.9.10 While the population abundance for some species must be revised upwards, the previously described mitigation measures remain achievable and the success of the first section works can be replicated across the remainder of the route.

8.10 Conclusion

- 8.10.1 The drafting of the original ES was challenging due to the lack of direct site access, each decision thereafter being a progression of a process that was devised to adjust to the resulting absence of data. That the subsequently devised approach and ecology chapter of the ES falls outside the established norms of best practise and often also the published guidance is not disputed. Faced with the task of producing an impact assessment that could meaningfully inform the development of the scheme, the team took the only approach that was appropriate in the circumstances. As set out in previous chapters, this is not without precedent and does not fall foul of the edicts of the EIA regulations.
- 8.10.2 The assumptions on which the ES were based were considered proportionate and more importantly suitably precautionary to inform the design of the scheme. Those assumptions have now in any case started to be superseded by the investigations and re-assessment of the status of multiple legally protected species identified from direct survey in the Junction Road to Austen’s Bridge section of the route.
- 8.10.3 With some clarifications and amendments, partly needed just to deal with changing advice over time, the LPA approved the ES as sufficient to grant planning permission with appropriate conditions attached. Not only has the information, assessment and mitigation solution for the relevant ecology conditions been approved, the new data has been demonstrated to be sufficient for Natural England to issue two separate consents for badgers and dormice.
- 8.10.4 The ES as submitted, required an impact assessment to be re-run once access had been achieved and the relevant baseline surveys completed. The documents produced to acquit the planning conditions and as part of the consenting regime have effectively acted as de-facto Ecological Impact Assessments (EcIA). This is explicit within the CEMP which

references the survey reports (providing baseline and value) and goes on to risk assess the construction activities (Table 2.1) and then provides mitigation and compensations measures in far greater granularity as might be expected within an ES. The LEMP augmenting the information in the CEMP with longer term management prescriptions.

- 8.10.5 That Natural England have issued derogation consents for the two key receptors encountered thus far in the process, surely demonstrates the viability of the ecological mitigation strategy for the scheme. As and when access is allowed for detailed surveys of the rest of the route, the value of the ecological receptors can finally be accurately assessed. With an accurate baseline and full picture of the status of the valued receptors a scheme wide master-plan can be developed for each receptor and to tie in and detail all of the habitat compensation and enhancement measures that will be required. Whilst it is clear that some of the assumptions within the ES undervalued some of the receptors, this does not invalidate its conclusions.
- 8.10.6 With a scheme with a finite footprint and not yet fully quantified habitat creation being required, there could have been a risk that when fully determined the final volume of land required to off-set the impacts of the scheme may not be able to be accommodated within the existing footprint. However, there is now more land available for ecological compensation than was the case when the ES was originally drafted, and 2/3 of the previously calculated scrub habitat has already been planted off-site.
- 8.10.7 Once access is permitted the relevant ecology surveys can be carried out and the EcIA revised. The process would by necessity include;
- a comprehensive suite of surveys;
 - a revised EcIA;
 - an ecology Master Plan for the whole of the route;
 - detailed CEMP and LEMP for the whole of the route;
 - individual or scheme wide EPSM consents for dormouse and great crested newt.
- 8.10.8 The works from 2017-2020 have fully adhered to accepted best practise for the receptors encountered and to the spirit if not always the letter of the ES, and should be considered as a viable blueprint for future works.

9.0 Water Quality, Hydrology and Hydrogeology

9.1 Specialist experience

- 9.1.1 Water Environment Ltd are specialist technical consulting engineers in the water and environmental sector of engineering. The company was founded in 2006 and has undertaken numerous EIAs and ES reports.
- 9.1.2 Claire Burroughs, who undertook this Technical Review, was the original author of the 2014 ES Water Quality, Hydrology and Hydrogeology Chapter and undertook the associated Water Framework Directive Assessment. Claire has over 8 years of experience in flood risk and was awarded Non-Chartered Member status through the Chartered Institution of Water and Environmental Management (CIWEM) in 2014. She has a MEng in Civil Engineering and a MSc DIC in Environmental Engineering. Claire currently works as a Senior Environmental Engineer providing technical advice and analysis for a wide range of projects.
- 9.1.3 Guy Laister, a director and co-founder of Water Environment Ltd, reviewed the work completed for the 2014 ES and this Technical Review. Guy has a Masters degree in Civil Engineering (graduated Cum Laude) and has more than 15 years of technical experience in the environmental engineering sector. Guy is a Chartered Engineer (CEng), a Chartered Environmentalist (CEnv), a Chartered Water and Environmental Manager (C.WEM) and a full member of the Chartered Institution of Water and Environmental Management (MCIWEM).

9.2 Review of existing ES and Addendums

Policy and regulations

- 9.2.1 There have been several changes to national and local planning policy since the original ES was drafted in 2014. Where relevant, updated policy is detailed below.

National Planning Policy Framework and Planning Practice Guidance

- 9.2.2 The National Planning Policy Framework (NPPF)¹⁷, the Town and Country Planning Orders, and associated supplementary planning guidance, have been revised and updated several times since 2014. The most current version of the NPPF, referred to as the “revised NPPF”, was published in July 2018 and was last updated in June 2019. The updates relating to flood risk since 2014 are minor.
- 9.2.3 The accompanying Technical Guidance to the NPPF was superseded by the introduction of the Planning Practice Guidance (PPG)¹⁸ in March 2014. The section on Flood Risk and Coastal Change of the PPG remains similar to the Technical Guidance for the NPPF but it is a “live” document and there have been periodic updates since its launch.

¹⁷ Ministry of Housing, Communities and Local Government (June 2019), revised National Planning Policy Framework

¹⁸ Ministry of Housing, Communities and Local Government (Live Document), Planning Practice Guidance [online] Available: <https://www.gov.uk/government/collections/planning-practice-guidance>

- 9.2.4 The PPG expands on the strategy defined in the NPPF by providing specific guidance to local authorities and developers within each section. The PPG sections that are relevant to water resources and flood risk are as follows:
- Climate Change¹⁹ – addresses the consideration of future climate change based on national projections in the assessment of flood risk,
 - Flood Risk and Coastal Change²⁰ – provides detailed guidance for the assessment of flood risk; and
 - Water Supply, Wastewater and Water Quality²¹ – provides the strategy for infrastructure provision and for the protection and enhancement of clean and biologically diverse water features.
- 9.2.5 In February 2016, the climate change allowances for peak river flows and peak rainfall intensity, as referenced in the PPG on Flood Risk and Coastal Change, changed significantly for assessing flood risk. The new climate change allowances²² replace the nationally applied flat rate of 20% with a range of allowances that vary according to allowance category (percentile), river basin district and future time-period. The range of allowance categories used in flood risk assessments is based on flood zones and flood risk vulnerability classification.
- 9.2.6 Climate change allowances for peak river flow in the South East river basin district now range from 10% to 105%. The peak rainfall intensity climate change allowances do not vary by geographical region but now range from 5% to 40% and apply to small catchments (less than 5 km²) and urban catchments.

25 Year Environment Plan

- 9.2.7 The HM Government A Green Future: Our 25 Year Plan to Improve the Environment²³ was published in January 2018. This plan requires:
- Improving at least three quarters of our waters to be close to their natural state as soon as practicable by: reaching or exceeding objectives for rivers, lakes, coastal and ground waters that are specially protected, weather for biodiversity or drinking water as per our River Basin Management Plans; and
 - Reduce the risk of harm to people, the environment and the economy from natural hazards including flooding, drought and coastal erosion.

¹⁹ Ministry of Housing, Communities and Local Government (Updated: June 2020), Climate Change – Planning Practice Guidance

²⁰ Ministry of Housing, Communities and Local Government (Updated: July 2020), Flood Risk and Coastal Change - Planning Practice Guidance

²¹ Ministry of Housing, Communities and Local Government (Updated:22/06/2019), Water supply, wastewater and water quality - Planning Practice Guidance

²² Environment Agency (March 2020), Flood Risk Assessment: climate change allowances. <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

²³ Department for Environment, Food and Rural Affairs, January 2018, 25 Year Environment Plan (updated May 2019)

Water Framework Directive

- 9.2.8 The Water Framework Directive (2000/60/EC)²⁴ (WFD) commits EU member states to achieving a good qualitative and, for groundwater, quantitative status in terms of ecology, chemistry and river flows in all ground and surface waterbodies by 2015, the end of the First Management Cycle or by 2021 or 2027, the end of the Second and Third Management Cycles, respectively. The overarching goals of the WFD remain to:
- protect, enhance and restore surface waterbodies and groundwater bodies, achieving good chemical, ecological and quantitative status in all waters;
 - prevent pollution and deterioration of all waters;
 - balance groundwater abstraction and replenishment; and
 - preserve specifically protected areas.
- 9.2.9 It is therefore necessary to ensure new development does not cause pollution or place unnecessary burden on watercourses; and to promote the restoration of natural surface water features and provision of SuDS for surface water management. Nutrient Management Plans identify sources of nutrients that are entering rivers and steps that can be taken to manage them. None have been created for the River Rother catchment.
- 9.2.10 An updated Water Framework Directive Assessment (Appendix C) has been completed to accompany this ES revalidation, considering updates to the local River Basin Management Plan (RBMP) since initial completion of the assessment, and updating the current status of affected waterbodies under the WFD Second Management Cycle.

Sustainable Drainage

- 9.2.11 Since April 2015, a House of Commons Written Statement (HCWS161) has required that major developments - developments of 10 dwellings or more; or equivalent non-residential or mixed development (as set out in Article 2(1) of the Town and Country Planning (Development Management Procedure) (England) Order 2010) - are required to ensure that sustainable drainage systems for the management of surface water run-off are put in place, unless it can be demonstrated that SuDS are inappropriate.
- 9.2.12 At the same time, Lead Local Flood Authorities (LLFA) became a statutory consultee on planning applications for surface water management. East Sussex County Council became the LLFA for area.
- 9.2.13 The Department for Environment, Food and Rural Affairs (DEFRA) has produced non-statutory technical standards for the design, maintenance and operation of sustainable drainage systems to drain surface water.

Local Core Strategy

- 9.2.14 A new Core Strategy was adopted by Rother District Council (RDC) in September 2014. Several policies relate to water and flood risk. These are detailed below.
- 9.2.15 Policy EN6: Flood Risk Management key points in relation to the Proposed Scheme are:

²⁴ The Water Framework Directive, Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000

iii) Fluvial flood risk is minimised by implementing the policies of the Rother and Romney Catchment Flood Management Plan...

iv) Proposed flood protection measures should have full regard to sensitive areas designated with specific nature conservation and biodiversity interests such as RAMSAR, SAC, SPC, LNR and SSSI.

9.2.16 Policy EN7: Flood Risk and Development states:

Flood risk will be taken into account at all stages in the planning process to avoid inappropriate development in areas at current or future risk from flooding, and to direct development away from areas of highest risk.

i) Where development is proposed in an area as at flood risk, the applicant will be required to submit a site-specific Flood Risk Assessment which demonstrates that the development will be safe, will not increase flood risk elsewhere, and, where possible will reduce flooding;

ii) When development is, exceptionally, acceptable in flood risk areas consideration is paid to the layout and form of the development to minimise flood risk;

iii) Drainage systems and sustainable drainage systems for all the new development are in accordance with the Flood and Water Management Act 2010;

iv) Where it is appropriate, contributions will be sought for improvements to infrastructure to mitigate against flood risk.

9.2.17 Policy SRM2: Water Supply and Wastewater Management states:

ii) Ensuring that new development does not have an adverse effect on the water quality and potential yield of water resources, in line with the objectives of the South East River Basin Management Plan, including reference to groundwater 'source protection zones';

iii) The promotion of sustainable drainage systems to control the quantity and rate of run-off as well as to improve water quality wherever practicable, and specifically for all the development that creates impermeable surfaces within the hydrological catchment of the Pevensey Levels.

Local Flood Risk Management Strategy

9.2.18 East Sussex Local Flood Risk Management Strategy is updated on a regular basis. The most current document covers 2016-2026. It is a high level, statutory document that sets out East Sussex County Council's approach to limiting the impacts of local flooding across the county. It promotes greater partnership working arrangements between those organisations with a responsibility for managing local flood risk and provides a strategic framework within which the 'Risk Management Authorities' must work. This covers the guiding principles of East Sussex on flood risk management during this period.

9.2.19 Comparing with the previous strategy for the area, this strategy includes the new requirements for sustainable (urban) drainage (SuDS) for "Major Development".

Preliminary Flood Risk Assessment, Strategic Flood Risk Assessment and Surface Water Management Plans

- 9.2.20 The East Sussex Preliminary Flood Risk Assessment (PFRA) and Rother Valley Strategic Flood Risk Assessment (SFRA) are “live” documents but have not been revised since their issue in 2011 and 2008, respectively.
- 9.2.21 All PFRA’s had an addendum created in December 2017, including East Sussex. This covered updates to flooding policy in the county such as the creation of the East Sussex LLFA, the statutory consultee to the planning process on sustainable (urban) drainage (SuDS). In addition, the addendum notes the creation of Surface Water Management Plans (SWMP) and flood investigations (Section 19 reports).
- 9.2.22 No SWMP or associated Section 19 reports cover the Proposed Scheme.

Sustainable Drainage

- 9.2.23 East Sussex has published a number of documents related to SuDS: Water People Places produced for South East England by AECOM published in 2013, Guide to SuDS in East Sussex published in 2015 and an online SuDS Tool.
- 9.2.24 Under their LLFA responsibilities, East Sussex County Council have a dedicated list of requirements of design for SuDS in relation to proposed developments.

Methodology and best practice

Methodology

- 9.2.25 The methodology of the Water Quality, Hydrology and Hydrogeology chapter remains unchanged since 2014.
- 9.2.26 As per the original ES, the assessment of “Water” is based on the DMRB, Volume 11, Section 3, Part 10 (Road Drainage and the Water Environment) and applies to both the demolition, construction and completed development stages.
- 9.2.27 The standard WFD and FRA methodology has also remained unchanged since 2014, with both reports updated to reflect changes in policy and data only.

Best practice

- 9.2.28 The GOV.UK website provides advice on the Environmental Permitting regime and good environmental practice to help reduce environmental risks from business activities. The relevant guidelines are contained in the ‘Environment and Countryside’²⁵ section of the website.
- 9.2.29 The Environment Agency Pollution Prevention Guidance referred to in the 2014 reporting are now superseded. The current Environment Agency guidelines for the prevention of

²⁵ <https://www.gov.uk/browse/environment-countryside>

pollution are distributed through a number of online guidance documents such as Pollution Prevention for Business²⁶, Manage Water on Land²⁷, and oil storage regulations²⁸.

- 9.2.30 The Environment Agency culvert design has been superseded with the CIRIA Culvert, Screen and Outfall Manual (C786F). The detailed design of the culvert, screen and any outfalls to the River Rother or Mill Stream should follow the CIRIA Guidance.
- 9.2.31 The Scottish Environment Protection Agency (SEPA) have also updated their guidance on culverting watercourses in relation to the WFD, which is relied upon within the WFD Assessment.

Consultation

- 9.2.32 Since the 2014 assessment, Capita have had ongoing consultation with the Environment Agency in relation to the flood defences within Robertsbridge and the climate change allowances to be used in assessing flood risk.

9.3 Baseline

Data sources

- 9.3.2 The following information was relied upon within the original report to determine the Baseline:
- data on surface water quality from the Environment Agency and published sources;
 - data on flood flows and water levels from the Environment Agency and published sources;
 - the Flood Estimation Handbook (CD-ROM Version 3);
 - sewer asset plans from statutory undertakers;
 - published data collected by the Institute of Hydrology and British Geological Society;
 - walkover survey, and
 - information compiled as part of any investigative works associated with the project.
- 9.3.3 Since 2014, several updates have occurred to the original baseline data. The following datasets have been updated:
- data on surface water quality from the Environment Agency and published sources.
 - data on flood flows and water levels from the Environment Agency and published sources;
 - the Flood Estimation Handbook (FEH Web Service) has superseded the Flood Estimation Handbook CD-ROM Version 3; and
 - published data collected by the Institute of Hydrology.

²⁶ <https://www.gov.uk/guidance/pollution-prevention-for-businesses>

²⁷ <https://www.gov.uk/guidance/manage-water-on-land-guidance-for-land-managers>

²⁸ <https://www.gov.uk/guidance/storing-oil-at-a-home-or-business>

- 9.3.4 Additional and supplementary information on surface water features have been obtained from the current Ordnance Survey (OS) maps, site surveys and aerial photographs.

Environment Agency website

- 9.3.5 Key changes to the presentation of the baseline data have been made since the publication of the 2014 ES. This includes the dissolution of the Environment Agency website and the data provided being transferred to the GOV.UK website or DEFRA's Magic Maps website.
- 9.3.6 This transfer of information included the Flood Map for Planning and other flood maps now available on the GOV.UK website. The aquifer designation map is now located on the DEFRA Magic Maps.
- 9.3.7 The Environment Agency data is regularly updated on the GOV.UK website and the risk of flooding from surface water maps were first published in 2014, after the completion of the 2014 reporting. The original 2013 FRA and the updated 2016 FRA undertaken by Capita reported that the risk of surface water to the Proposed Scheme was low to medium risk. The latest Capita FRA reflects the most up-to-date EA data available.
- 9.3.8 The groundwater information on DEFRA Magic Maps remains as per 2013 assessment.

Hydrological methods

- 9.3.9 The hydrological methods and associated data used to determine the design inflows for a hydraulic model have been significantly updated since 2013. A complete update of the hydrology was therefore required due to changes to the input data. This update included the catchment descriptors and software updates to the Flood Estimation Handbook (FEH) and ReFH.
- 9.3.10 Capita has therefore updated the underlying hydrological inputs to the hydraulic modelling, which informs the addendum Flood Risk Assessment.
- 9.3.11 The updated hydrology for the hydraulic model now uses the FEH Web Service to provide the catchment descriptors rather than the former FEH CD-ROM Version 3. This update now includes the updated BFIHOST (Base Flow Index), URBEXT (urban extent), and URBLOC (describing the location of urban area in the catchment).
- 9.3.12 In addition, the updated hydrology used the most recent FEH and ReFH software to determine catchment flows, since these software packages have had significant updates since 2013. Within these software packages several calculations have been revised, and the Depth Duration Frequency (DDF) curves have been updated. Capita, as part of the updated hydrology, reviewed both software packages (FEH and ReFH2 version 2.3) to determine which is most suitable to provide inflows for the hydraulic model.
- 9.3.13 The National River Flow Archive (NFRA) website shows that the nearest gauge records daily, monthly, and peak river flow data. Record of flood flows and levels has continued by the Environment Agency and the NFRA since 2013, and Capita have used the latest version of the NFRA dataset (Version 9) to inform the hydrology of the hydraulic model and the FRA.

- 9.3.14 The closest gauging station (4004 - Rother at Udiam) is located downstream of Robertsbridge and upstream of Bodiam. This remains unchanged from the 2013 assessment and there are no further or new gauging stations of relevance.
- 9.3.15 The design flows used in the hydraulic model have been updated to reflect the additional years of monitored gauge data and the latest updates to the methods used in determining flood flow estimations. Capita determined that the FEH Statistical Method is the most appropriate hydrological method to provide catchment inflows to the hydraulic model and the addendum FRA. This is because it provided higher flows than ReFH2.

Climate change allowances

- 9.3.16 The design flood (1 in 100 year plus climate change event) is the event which development needs to be analysed against to determine the risk of flooding. Due to the significant changes to the climate change allowances in 2016, Capita has updated the hydraulic model to reflect the latest allowances, which now vary across the country. The previous model used the blanket 20% climate change allowance.
- 9.3.17 The current climate change allowances are based on a sliding scale which are determined by Flood Zone, type of development proposed, life expectancy of the development, and the river basin it is located within.
- 9.3.18 The Proposed Scheme lies within all Flood Zones (Flood Zone 3, 2 and 1) and is deemed to be “Less Vulnerable” (Capita Addendum FRA) as it does not need to be operational during a flood event and is not considered essential transport infrastructure. The development is expected to have a life expectancy of over 50 years which places it in the “2080’s” future time period and lies within the South East river basin district. This means the Higher Central and Upper End scenarios should be used to assess the Proposed Scheme.
- 9.3.19 The Inspector has requested: *An updated flood risk assessment (FRA) making appropriate allowance for climate change in accordance with the Planning Practice Guidance on Flood Risk assessments, which incorporates the revised UKCP18 climate projections...*
- 9.3.20 Capita consulted the Environment Agency in June 2020 and December 2020 regarding whether the climate change guidance for fluvial flooding had been updated based on the revised UKCP18 climate projections. Capita were informed by the Environment Agency that *“The current allowances are based on UKCP09. Work to translate the rainfall projections into peak river flow uplifts then to covert that data into allowances is underway”* and that *“Work is continuing to derive and subsequently apply UKCP18 climate change projections to planning guidance. The latest estimate of the timescale for the change in guidance to take place is mid-2021.”*
- 9.3.21 The addendum FRA states that the *“Environment Agency also confirmed that comparison of the UKCP09 allowances against the provisional UKCP18 figures (for the study area) indicates similar figures for the Central and Upper Central scenarios. The provisional UKCP18 figure for the Upper End scenario is lower than the UKCP09 allowance.”*
- 9.3.22 In accordance with the current climate change guidance, the “Central” and “Higher Central” climate change allowances should be used to assess a range of impact, equal to an increase in peak river flow of 35% and 45%, respectively. The addendum Flood Risk

Assessment states that the “*Environment Agency have confirmed that this “approach we would support given the current uncertainties for UKCP18”*”. The assessment of fluvial flood risk documented in the addendum FRA and this assessment applies the current published Climate Change Allowance Guidance based on UKCP09 for the Higher Central and Upper End scenarios.

- 9.3.23 Although the Inspector mentions the use of the UKCP18 climate change allowances, the Inspector does clarify their position in that “*the updated assessment is required to ensure that the flood model takes into account the most up to date river flow allowances, ensuring that any flood mitigation is of sufficient scope (for example, whether flood plain storage compensation is required and if it is, where it would be provided).*”
- 9.3.24 As such, Capita have rerun the model with the 45% current climate change allowances to ensure compliance with current legislation. This has been agreed with the Environment Agency.

Hydraulic modelling

- 9.3.25 Capita have also updated the hydraulic model which informs the addendum FRA. This included updating the underlying hydrology and the use of the current Flood Modeller - TuFLOW software versions (Flood Modeller v4.5 and TUFLOW 2018-03-AA-iSP-w64)
- 9.3.26 The hydraulic modelling also revised the two-dimensional (2D) grid resolution downstream of Salehurst from the original 20m grid to a more refined 5m grid. This has resulted in a more refined 2D flood extent.
- 9.3.27 In addition, the addendum FRA also states that the 1D-2D links were also updated in the hydraulic model to reflect current best practise and improvements in modelling since the original assessment.
- 9.3.28 All updates to the hydraulic model are described in the addendum FRA and associated appendixes.

Historical flooding

- 9.3.29 A number of fluvial flood events have occurred within the River Rother catchment since 2013.
- 9.3.30 The River Rother exceeded its channel capacity during the heavy rainfall events in December 2019 and February 2020. These recent flood events are recorded in the Capita hydrology Calculation Record which is appended to the addendum FRA.
- 9.3.31 The December 2019 flood event resulted in landslips on the Medway Valley Line between Robertsbridge and Etchingham²⁹. No published information was found on the extent of flooding during this event.
- 9.3.32 Locals photographs at the time of the February 2020 flood event show the cricket pitch and the children’s playground in Robertsbridge were flooded³⁰.

²⁹ <https://www.newcivilengineer.com/latest/calls-for-greater-investment-in-flood-defences-as-uk-hit-by-heavy-rain-24-12-2019/>

³⁰ <https://www.vinehallschool.com/2020/03/06/year-7-examine-robertsbridge-floods/>

Flood risk

- 9.3.33 An addendum FRA has been undertaken by Capita for the Proposed Scheme, to reflect the updated baseline data, climate change allowances and updates in hydraulic modelling software since 2013.
- 9.3.34 Fluvial and surface water flooding is related to the flow and velocity regimes of the all above-ground waterbodies. Since the River Rother design flood event (1 in 100 year plus climate change) has been updated, flooding from these sources will need to be reassessed against the Proposed Scheme.
- 9.3.35 The other sources of flood risk to the Proposed Scheme remain unchanged from the 2013 Flood Risk Assessment and addendum Flood Risk Assessment completed in 2016.

Surface water quality

- 9.3.36 At the time of completion of the 2014 Water Framework Directive Assessment, WFD Cycle 1 was in action for England and Wales. The Environment Agency online catchment data explorer provided the details on water quality for the River Rother.
- 9.3.37 During the initial assessment, the Proposed Scheme intersected a catchment identified as “Robertsbridge to Iden”. The Proposed Scheme is now located within the “Lower Rother from Etchingham to Scott’s Float” catchment, which covers a larger area.
- 9.3.38 In 2013, the overall waterbody classification of this section of the Lower Rother was considered “Moderate”, with ecological status as “Moderate”, and the chemical status “Good”.
- 9.3.39 Since 2014, the WFD Cycle 2 has commenced and the overall classification for the River Rother has been maintained “Moderate” status overall from 2013 to 2019. The latest WFD classifications for the reach are from 2019. The ecological status has remained at “Moderate”, but the chemical status has been downgraded to “Fail” in 2019 due to a number of pollutants and priority hazardous substances found in the reach.
- 9.3.40 The Lower Rother still has a number of issues which prevent it from reaching the “Good” potential. The main reasons are that the watercourse is deemed to be “Heavily Modified” and that pollution from agriculture, poor land management and spills from wastewater plants still cause issues with water quality. Overcoming these issues, would result in “disproportionate burdens” and “no known technical solution is available”.

Hydrogeology and groundwater quality

- 9.3.41 The baseline bedrock and superficial geology data has not changed since 2014.
- 9.3.42 Kent Wealds Eastern Rother groundwater status is “Poor” overall, with “Good” quantitative status but a “Fail” for chemical status. It targets “Good” overall status by 2027. There has been no change in its status since 2014.

Changes to the Proposed Scheme design and construction

- 9.3.43 Since 2014, amendments have been made to the Proposed Scheme, including changes to the track elevations, number of culverts, viaducts and bridges.

- 9.3.44 Updated hydraulic modelling has been undertaken by Capita and an addendum FRA has issued which considered the impact of these design changes on baseline and post-development fluvial flooding situation.
- 9.3.45 Proposed soffit levels across the River Rother, and the capacity of culverts and access bridges throughout the Proposed Scheme, need to be assessed in line with the updated climate change flood water levels to ensure that the Proposed Scheme does not impact negatively on the continuity of the floodplain nor increase flood risk on third-party land.
- 9.3.46 Re-assessment of temporary bridges, river diversions and any works compounds that are to be located in the floodplain, will also be required once final designs are completed and agreed.

9.4 Continued validity of assessment

- 9.4.1 Since the original 2014 ES, there have been various changes to policy, input data and software that could affect the assessment of flood risk impacts.
- 9.4.2 The most significant policy change is the update to the climate change allowances. The hydraulic model has been re-run including revised climate change uplift to comply with current planning policy and assess the effects on receptors identified.
- 9.4.3 Due to these updates to baseline data, the Proposed Scheme needs to be re-assessed to ensure compliance with current legislation.
- 9.4.4 The other matter to consider for the Proposed Scheme is the provision of SuDS due to legislation changes for Major Development. However, the Proposed Scheme has already been granted planning permission (RR/2014/1608/P) under the Town and Country Planning Act 1990 and therefore this consideration has already been taken into account through the planning process.

Updates to receptors

- 9.4.5 A review of the receptors within the floodplain was undertaken and those included in the 2014 ES are still current.
- 9.4.6 No new receptors have been identified during this review; however, Forge Farm was described as a potential receptor in 2014. It had previously been used for industrial units but, at the time of assessment, had been demolished and there was no evidence of new development. Forge Farm is now known locally as “Compass Park” and has several new offices on the site. This receptor is now scoped back in the current assessment to determine if it is at risk of fluvial flooding from the Proposed Scheme considering the updated hydraulic modelling.
- 9.4.7 In addition, since the 2014 ES, a large farm building has been constructed at Russets Farm, which is located in Flood Zone 1 but close to Flood Zone 2 and 3. This new farm building will also be included in the revised assessment of the Russet Farm receptor.
- 9.4.8 No other changes to receptors were identified while undertaking this update to the assessment.

Re-assessment of effects

- 9.4.9 Capita have rerun the hydraulic model and produced an addendum FRA with the results of the new modelling. This addendum includes updates to the baseline data and the revised climate change allowances.
- 9.4.10 The WFD screening assessment has also been updated to include Cycle 2 baseline data and information provided by the Capita addendum FRA.

Construction

- 9.4.11 There are no changes to the predicted effects from the construction of the Proposed Scheme since the 2014 assessment and this remains valid.

Operation

- 9.4.12 The addendum FRA only evaluates updates to the fluvial flood risk. Other sources of flood risk were determined to not have changed since the 2013 assessment.
- 9.4.13 The impact of the Proposed Scheme, when compared to the baseline, is presented in **Table 9.1** for each of the identified receptors. This table includes predicted maximum water levels for the 5% AEP, 1% AEP and 1% AEP plus climate change event, updated to reflect revisions to the input hydrology, hydraulic modelling advances and changes to the design.
- 9.4.14 The assessment of flood risk will review the 1% AEP plus 45% climate change event as this is the design flood event.
- 9.4.15 The updated and more refined hydraulic modelling shows that several receptors are now not at risk of flooding, an improvement on the 2013 assessment. This includes the residential and commercial properties on the Clappers, commercial properties on Station Road, commercial units north of the Mill Stream, Robertsbridge Abbey, Udiam Cottages, the pumping station at the confluence of the Mill Stream and the River Rother, and the properties on Northbridge Street.
- 9.4.16 At Forge Farm, flood water encroaches onto the site, but the FRA has determined that the new Compass Park office buildings do not flood. This is the same situation with the Redlands, the residential properties on Willow Bank and the cul-de-sac off Station Road which backs onto the stream in Robertsbridge.
- 9.4.17 A number of receptors will remain at risk of flooding both in the baseline assessment and with the Proposed Scheme. These include some of the commercial properties in Robertsbridge, the cricket pavilion, Ivy Cottage, Park Farm Caravan and Camping site, and the electrical sub-station in Robertsbridge.
- 9.4.18 The addendum FRA shows that some areas, which are not identified receptors, do show an increase in flood depth due to the Proposed Scheme. These areas consist entirely of agricultural land which lies to the west of the Clappers, land to the south of Moat Farm (north of the Scheme), land south west of existing bridge across the River Rother (Austens Bridge), and the land east of B2214. These impacts can be seen in the Flood Risk Assessment.
- 9.4.19 Typically, with the Proposed Scheme, these areas are shown to have an increase in flood water depth between 0.01m and 0.05m (10-50mm). The exception is that within these

areas some pockets show a deeper increase in flood water due to the pooling against the Scheme. The greatest increase in depth is shown to be approximately 0.1m (100mm) and this is within the land to the east of the Clappers.

Table 9.1 - Difference in predicted maximum water level between Baseline and Scheme for identified receptors

Location	Difference in predicted maximum water level of Proposed Scheme vs baseline (m)		
	5% AEP (1 in 20) Design Flood Event	1% AEP (1 in 100) Design Flood Event	1% AEP (1 in 100) Design Flood Event with 45% CC allowance
Commercial property Robertsbridge	Not predicted to flood	-0.01	-0.03
Property on The Clappers	Not predicted to flood	Not predicted to flood	Not predicted to flood
Property Northbridge Street	Not predicted to flood	Not predicted to flood	Not predicted to flood
Property in Robertsbridge (west)	Not predicted to flood	Not predicted to flood	Not predicted to flood
Property in Robertsbridge (east)	Not predicted to flood	Not predicted to flood	Not predicted to flood
Ivy Cottage	Not predicted to flood	Not predicted to flood	-0.09
Forge Farm	Not predicted to flood	Not predicted to flood	Not predicted to flood
Cricket Pavilion	0.00	0.00	-0.03
Pumping Station	Not predicted to flood	Not predicted to flood	Not predicted to flood
Redlands	Not predicted to flood	0.00	0.00
Moat Farm	Not predicted to flood	Not predicted to flood	Not predicted to flood
Park Farm Caravan and Camping	0.00	0.00	-0.01
Electricity sub station	0.00	0.00	-0.04

- 9.4.20 In terms of surface water quality, an update to the WFD Screening Assessment has been undertaken to reflect recent changes in waterbody status. This is provided in **Appendix C**. Despite minor changes in design, it is not considered that updates are significant enough to change conclusions reached in the 2014 ES.
- 9.4.21 Groundwater impacts are also considered within the updated WFD. As per Condition 12 of the planning permission (RR/2014/1608/P) the Proposed Scheme will be required to undertake a detailed risk assessment in relation to contamination. Until this contamination assessment has been undertaken, potential risks under the WFD cannot be ruled out. Therefore, the WFD concludes that there may be the potential of a risk to both ground and surface waterbodies due to disturbance of contaminated land within the old embankment. This conclusion remains unchanged since the 2014 assessment, and therefore conclusions to the ES remain the same.

Mitigation

Environmental Permitting

- 9.4.22 The Lead Local Flood Authority (LLFA) are now the consenting authority for works within an Ordinary Watercourse. The Environment Agency will remain the Consenting Authority for Main Rivers.
- 9.4.23 The Proposed Scheme will need to seek an Environmental Permit from the Environment Agency, prior to commencement of any works on site. This was previously call Flood Defence Consent. The process is the same as it was in 2014 but the permit name has changed.

Construction

- 9.4.24 All mitigation requirements should be incorporated into the Construction Environmental Management Plan (CEMP), which will form part of the contractor's construction plan. The CEMP is to be approved by the local planning authority as per Condition 6 of the planning permission (RR/2014/1608/P).
- 9.4.25 There is updated guidance documentation in relation to protection of water quality, which has been included in revalidation report and within the WFD assessment. The draft CEMP should consider all latest guidance, as available at the time of writing, and ensure up-to-date best practice methodology is followed.
- 9.4.26 There are no changes to the required mitigation measures outlined in the 2014 assessment for the construction phase of the Proposed Scheme, except where guidance documents have been updated and should now be adhered to.

Operation

- 9.4.27 The Proposed Scheme proposes a combination of floodplain culverts, bridges, and sections of railway track at elevations close to existing ground levels to maintain floodplain flow paths and minimise the impact of the proposed railway on flood risk.
- 9.4.28 The addendum FRA states that "*discussions with the Environment Agency regarding compensatory flood storage will be required to address planning condition 11.*" These are ongoing.
- 9.4.29 Typically, floodplain compensation is only required where there is an impact on third-party receptors because of an increase in flooding due to the Proposed Scheme. The updated modelling shows that the railway Scheme does not impact on any of the identified receptors and therefore does not pose any increase in the risk of flooding to them.
- 9.4.30 Previously, the Proposed Scheme required floodplain compensation to mitigate against any increase in flood risk to the identified receptors. The updated modelling shows no increase in flood risk to the identified receptors and as such, floodplain compensation may not be required. This need to be confirmed with the Environment Agency.
- 9.4.31 There are some small areas within the agricultural land which are shown to have an increase of flood water depth due the Proposed Scheme. This will need to be presented to and agreed with the Environment Agency.

- 9.4.32 There have been ongoing discussions with the Environment Agency regarding replacement of the existing flood embankment with a flood wall downstream of The Clappers. The addendum FRA has stated that this *“will provide a very small volume of additional floodplain storage and the section of existing embankment near Saleshurst will be slightly lowered, providing some compensatory floodplain storage.”*
- 9.4.33 The FRA concludes that the post-development plus mitigation scenario will not increase water flood risk to the identified receptors nor the Proposed Scheme itself.
- 9.4.34 In terms of surface water quality and groundwater assessment, despite minor updates to the Proposed Scheme and baseline data, the 2014 assessment for these section in remain valid.

Residual effects

- 9.4.35 The proposed railway embankments would cause an obstruction to flood flows, and hydraulic modelling shows that, in the absence of mitigation, the depth and extent of flooding would increase in some small areas following the reinstatement of the railway. However, culverts have been incorporated as mitigation within the design to reduce flood risk and allow water to flow through the embankments.
- 9.4.36 In terms of identified key receptors, the residual change in depth of flooding due to the Proposed Scheme is within 0.01m (10mm) tolerance. As per the standard methodology, the Proposed Scheme has a “Negligible” impact on the identified receptors. This is an improvement on the 2013 assessment.
- 9.4.37 Taking the most vulnerable developments; the electrical substation and pumping station, the importance of the receptor is “Very High” due to them being essential infrastructure. As such, a “Negligible” impact on a “Very High” value receptor has a “Neutral” effect from the Proposed Scheme according to the methodology.
- 9.4.38 Whilst key receptors are shown not to be affected by an increase in flood water depths from the Proposed Scheme, the proposed railway will result in a residual, permanent minor increase in flood water depths in some areas of the floodplain. **Table 9.1** shows the flood water difference of the identified receptors. These are small areas located on agricultural land but are shown to have up to approximately 0.1m (100mm) increase in flooding.
- 9.4.39 This means the Proposed Scheme has a “Minor Adverse” impact in these floodplain areas. In terms of significance, this “Minor” impact on a “Low” importance receptor would result in a “Neutral” potential effect.
- 9.4.40 Analysing all the receptors and the associated impact of the Proposed Scheme on fluvial flooding, once mitigation is considered, the Proposed Scheme has a “Neutral” potential effect overall. A summary of the residual effects on all receptors is shown in **Table 9.2**.

Table 9.2 - Residual Effects on Receptors

	Receptor	Magnitude of Impact	Significance of Potential Effect
Construction	None - provided mitigation measures are followed	Negligible	Neutral
Operation	Agriculture Land – Low	Minor Adverse	Neutral
	Electrical Substation – Very High	Negligible	Neutral
	Pumping station – Very High	Negligible	Neutral
	Commercial and residential properties in Robertsbridge – High	Negligible	Neutral
	Ivy Cottage - High	Negligible	Neutral
	Park Farm Caravan and Camping - High	Negligible	Neutral
	Moat Farm - High	Negligible	Neutral
	Redlands - High	Negligible	Neutral
	Cricket Pavilion - Medium	Negligible	Neutral

- 9.4.41 Further consultation with the Environment Agency with regards to the Proposed Scheme drainage design is required, particularly in regard to the WFD and water quality.
- 9.4.42 However, overall, this assessment presents an improvement to the 2013 assessment. **Table 9.3** and **Table 9.4** present a summary of the Water, Hydrology and Hydrogeology Effects overall for both construction and operation.

Table 9.3- Summary Effects Table: Water, Hydrology and Hydrogeology - Construction

Topic	Description	Geographical Extent	Importance	Magnitude	Mitigation	Significance	Change from 2013 Assessment
		Local (L) Regional (R) National (N) International (I)	Very High High Medium Low	Major Moderate Minor Negligible			
Flooding	Risk, frequency, extent, rate and duration of flooding	L	Low	Moderate Adverse	Minimising works in the channel and floodplain	Slight	No
Water Quality	Effect on water quality	R	Medium	Minor Adverse	Best practice	Slight	No
Groundwater	Effect on the groundwater	R	Medium	Negligible	Best practice	Neutral	No

Table 9.4- Summary Effects Table: Water, Hydrology and Hydrogeology - Operation

Topic	Description	Geographical Extent	Importance	Magnitude	Mitigation	Significance	Change from 2013 Assessment
		Local (L) Regional (R) National (N) International (I)	Very High High Medium Low	Major Moderate Minor Negligible			
Flooding	Risk, frequency, extent, rate and duration of flooding	L	Very High	Negligible	Recommendation as per the FRA.	Neutral	Yes
		L	Low	Minor	Recommendation as per the FRA.	Neutral	Yes
Water Quality	Effect on water quality	R	Medium	Minor	Design to minimise water quality contamination	Slight	No
Groundwater	Effect on the groundwater	R	Medium	Negligible	Potential pollutant design to be caught and not pollute groundwater	Neutral	No

Conclusions

- 9.4.43 Since 2014, there have been numerous and significant changes to planning policy which guided the original assessment. In addition, hydrology and climate data is continually updating, and the baseline information therefore required an update to meet current standards. As such, this ES chapter required revision.
- 9.4.44 Updates included changes to fundamental baseline hydrology, which included changes in catchment descriptors, software versions, and the DDF curves. In addition, the hydraulic modelling software has had numerous updates since 2014 which results in more accurate flood predictions. Capita have therefore updated both the hydrology and hydraulic modelling, and subsequently provided an updated FRA addendum.
- 9.4.45 The climate change allowances used within the 2013 Flood Risk Assessment and the interim addendum Flood Risk Assessment in 2016 utilised the 20% climate change allowance. This has since been superseded with a sliding scale of climate change allowance based on Flood Zone, development type and river basin. The current climate change allowances published by the Environment Agency are based on the UKCP09 climate predictions.
- 9.4.46 The Inspector has requested that the Flood Risk Assessment incorporates the revised UKCP18 climate projections. At present, there is no published guidance on the UKCP18 climate projections in relation to fluvial flows and rainfall. Capita did consult with the Environment Agency seeking guidance regarding the UKCP18 climate projections and the implications for this assessment. The Environment Agency confirmed that using the 45% climate change allowance from the UKCP09 climate predictions was acceptable due to the current uncertainties for UKCP18.
- 9.4.47 The Capita FRA addendum presents updated modelling information, considering improvements in hydrology, software and climate change allowances. This reports a reduction in flooding overall and provides a betterment to the results of the 2013 assessment.
- 9.4.48 Updated water quality monitoring and data meant the WFD assessment also needed to be updated, and as such has been revised. The conclusions of the WFD remains the same as the 2014 WFD assessment.
- 9.4.49 Best practice guidance for construction near watercourses is well established, as is pollution prevention. The contractor will adhere to relevant best practice guidance, implemented through a CEMP, to minimise the effect of the construction and to reduce the risks of pollution to groundwater and surface water bodies. On this basis, there are only "Slight" predicted significant effects on the water environment during construction, as per the 2014 assessment. These effects are expected to be short-term and localised.
- 9.4.50 Consultation with the Environment Agency is ongoing in regard to the detailed design, surface water management and delivery programme of the Proposed Scheme. As per updated guidance, permits will be required prior to commencement of any works.
- 9.4.51 The Proposed Scheme has a planning condition in relation to more investigation into the risk of contaminated land. This condition ensures the Proposed Scheme will fully investigate the risk and include mitigation measures if there are any pollution linkages to the River Rother or the Kent Weald Eastern- Rother groundwater body.

-
- 9.4.52 The Proposed Scheme also requires an Environmental Permit from the Environment Agency. The permitting system usually reviews the WFD, CEMP and requires a risk assessment for the Proposed Scheme. The permit must be approved before construction starts. This ensures Environment Agency can review the construction methodology and operational effects of the Proposed Scheme (once detailed design is completed) to prevent any cause detrimental effects on the River Rother or the Kent Weald Eastern-Rother groundwater body.
- 9.4.53 In addition, the Proposed Scheme is required to complete CEMP before any construction work is started. The CEMP will be reviewed under Condition 6 of the planning permission but also by the Environment Agency for the environmental permit. The CEMP document will outline any required mitigation measures to ensure the protection of the waterbodies from the construction of the Proposed Scheme.
- 9.4.54 The presence of the planning conditions (further investigation works for contaminated land and CEMP), and the Environmental Permit system should provide suitable safeguards to ensure the Proposed Scheme implements any required mitigation works to ensure there is no detrimental effects during the construction phase or when the Proposed Scheme becomes operational.
- 9.4.55 The Flood Risk Assessment has shown that the identified key receptors are not affected by an increase in flood water depths because of the Proposed Scheme. Some minor increases in flood water depths are shown on agricultural land within the floodplain.
- 9.4.56 Analysing all the receptors and the associated impact of the Proposed Scheme on fluvial flooding, the Proposed Scheme has a “Neutral” potential effect overall once mitigation measures are incorporated. This results in an improvement in the impact of fluvial flooding from the Proposed Scheme compared to the 2014 assessment.
- 9.4.57 All other potential effects can be mitigated such that the Proposed Scheme would have a neutral or no effect on water supply, water resources, water quality, groundwater, and surface water.

10.0 Archaeology and Cultural Heritage (archaeological remains)

10.1 Specialist experience

- 10.1.1 Rebecca Haslam (Project Officer, Pre-Construct Archaeology) is a commercial archaeologist with over twenty years' experience. She has expertise regarding the redevelopment of former railway sites, having been involved with York Engineering Triangle, the Stratford Railway Works and the redevelopment of King's Cross Central.

10.2 Review of existing ES and Addendums

- 10.2.1 This review considers the impact of the Proposed Scheme on Archaeology and Cultural Heritage as set out in Chapter 12: Archaeology and Cultural Heritage, and in Section 5: Archaeology and Cultural Heritage within Vol 3, Technical and Supporting Report 1 (June 2014). This review focuses upon the impact of the Proposed Scheme on archaeological remains. The impact of the Proposed Scheme on the setting (and hence significance) of built heritage assets (designated assets (Listed Buildings), Conservation Areas and non-designated buildings) has been reviewed separately.

Policy and regulations

- 10.2.1 An overview as to whether the Archaeology and Cultural Heritage assessment of the ES covers relevant policy and regulations is discussed in the Built Heritage review (Section 11) in order to avoid duplication.

Methodology and best practice

- 10.2.2 In summary, the scope is generally appropriate and proportionate to the type, location and scale of the Proposed Scheme.
- 10.2.3 In keeping with current industry standards, the study area is defined, and standards and guidance are clearly set out.
- 10.2.4 The methodology that was used to create the baseline is clear and includes all expected sources, such as an historic environment record search with an appropriate search radius (i.e. in a strip 1km either side of the Proposed Scheme), cartographic sources, aerial photographs, other desk-based research and a site walkover (using publicly available footpaths). The sites and monuments that fall within the study area are listed in Appendix 6A (2014 ES) and the locations of archaeological assets are shown on Figure 12.1(2014 ES). This information is used to predict the potential of the site for buried archaeological resources of different periods.
- 10.2.5 Potential impacts of the Proposed Scheme upon buried heritage assets resulting from both construction and operational phase impacts beyond current areas of truncation forms part of the methodology.
- 10.2.6 An assessment of cumulative effects is made, as is an assessment of potential mitigation measures. Residual effects are discussed.
- 10.2.7 The assessment methodology was undertaken in accordance with the Institute for Archaeologists (IfA) as set out in *Standards and Guidance for Archaeological Desk-Based*

Assessment (2012). The 2014 ES methodology was also agreed in advance with the East Sussex County Archaeologist by way of a Scope and Methodology Report.

- 10.2.8 The Chartered Institute of Archaeologists (CIfA) updated their *Standard and Guidance for Archaeological Desk-Based Assessment* (2014) in January 2017.³¹ In paragraph 3.4.1, the revised document now states: ‘an assessment of the significance of historic assets should include consideration, in England, of the archaeological, historic, architectural and artistic interests pertaining to the heritage asset, their significance and the extent to which that significance relates to different elements of the asset’s fabric’. As stated in that same document, more information regarding the assessment of significance can be found in Historic England’s Historic Environment Good Practice Advice Note 2: *Managing Significance in Decision-Taking in the Historic Environment*.³²
- 10.2.9 This review has considered the methodology used in the ES in view of these changes to industry-recognised methods. It is concluded that the individual methodologies used for calculating the effects of the Proposed Scheme on the significance of potential archaeological resources remains appropriate. There are, however, some methodological differences between those used in the ES and those that are more commonly applied in 2020 regarding terminology and data presentation.
- 10.2.10 Methodological omissions that are generally expected include formalisation of terms used to assess sensitivity (i.e. significance) of heritage assets, which are typically presented in table form (very high / high / medium / low / negligible / uncertain). These are assessed through an evaluation of the evidential, historical, aesthetic or communal value of the heritage asset in keeping with Historic England’s Conservation Principles (Ref 14.1).³³ In part this was not consistently attempted in the ES because insufficient evidence existed to assess significance in most cases (see paragraph 12.3.34 of the 2014 ES). The significance of heritage assets is nevertheless assessed appropriately in the document where this is practicable (termed ‘importance’ in the Resource Survival, Importance and Sensitivity section, paragraphs 12.3.30 to 12.3.36 of the 2014 ES).
- 10.2.11 Similarly, tables formalising terms used to predict the magnitude of impacts, namely the degree of removal or change to a heritage asset or its setting, taking into account mitigation measures and previous truncation, are not presented (normative terms are high / medium / low / negligible / uncertain). In part this is because the ways in which the original railway was constructed remain unknown, making this hard to accurately quantify in this instance (see paragraph 12.3.33 of the 2014 ES), however as set out in section 12.4 of the 2014 ES, it is reasonable to presume that the vast majority of the Proposed

³¹ Chartered Institute for Archaeologists, (2014, rev. 2017), *Standard and Guidance for Historic Environment Desk-Based Assessment*, Available: https://www.archaeologists.net/sites/default/files/CIfAS%26GDBA_3.pdf

³² Historic England 2015, *Managing Significance in Decision-Taking in the Historic Environment. Historic Environment Good Practice Advice in Planning: 2*, Available: <https://historicengland.org.uk/images-books/publications/gpa2-managing-significance-in-decision-taking/gpa2/>

³³ Historic England (then English Heritage) 2008 *Conservation Principles Policies and Guidance for the Sustainable Management of the Historic Environment*, Available: <https://historicengland.org.uk/images-books/publications/conservation-principles-sustainable-management-historic-environment/conservationprinciplespoliciesandguidanceapril08web/>

Scheme will take place within the footprint of the previously operational railway and as a result the impact is likely to be negligible.

- 10.2.12 Significance criteria, that is the significance of environmental effect, is determined by the sensitivity of the heritage asset and the degree of magnitude of change (normative terms are major / moderate / minor / negligible / uncertain). Again, tables relating to this do not appear in the report. Similarly, terms used to determine the effect of change (major adverse, moderate, minor, insignificant, uncertain, minor beneficial, moderate beneficial, major beneficial) are not set out formally in the methodology but are nevertheless used in the report to describe and quantify the results and also in the concluding sections as and when appropriate.
- 10.2.13 These methodological differences do not significantly alter the nature of the conclusions that would be drawn had the study been undertaken today. For example, a great deal of effort is made to define the sensitivity of Robertsbridge Abbey and the magnitude of the impact upon the setting of this nationally important heritage asset (see Section 12.4.9 of the 2014 ES).

Baseline

- 10.2.14 The baseline conditions are provided in Section 12 of 2014 ES, Vol 2 (Main Statement) and are given in detail in 2014 ES, Vol 3 Technical and Supporting Report 1 Section 5, making use of information in the ESHER, BGS data, the EHNMR aerial photographic database, other relevant desk-based research and a site visit.
- 10.2.15 Although the East Sussex Records Office was closed for relocation during the period when the data was collected, an adequate historic map search was nevertheless made using alternative sources. The acquired maps ranged in date from the late 17th century to the 20th century and were variously acquired online from the British Library, the Emapsite and Old Sussex Mapped. These maps are used to give an historical background to the Scheme Site and are adequately summarised in 2014 ES, Vol 2 Appendix 6B. The baseline section is thorough and well written.
- 10.2.16 The ESHER search was conducted over an area of 1km either side of a line between two points at the start and end of the Proposed Scheme (TQ 730 240 and TQ 780 240). This search area was entirely appropriate, however given that this occurred in 2014 the search is not necessarily up to date. The data is adequately summarised in Appendix 6A and their locations shown in Figure 12.1. Assessment tables were not included in the 2014 ES.
- 10.2.17 As part of this validation exercise, a second search of the ESHER was commissioned in April 2020. Few differences were found between the two searches. A table and map of additional HER entries is included here as Appendix D, Table 1 and Appendix D, Figure 1. It is not thought that these new additions change the conclusions reached in the 2014 assessment.

Changes to the Proposed Scheme design and construction

- 10.2.18 Since the ES was published, several minor changes have occurred to the Proposed Scheme design and construction programme in the vicinity of Robertsbridge at the west end of the Proposed Scheme, involving additional temporary land take (see Appendix D, Figure 2). These temporary land-take areas will be reinstated upon completion and are therefore only relevant to the construction phase.

- 10.2.19 An access and egress point is proposed on the north side of the railway line on the east side of Northbridge Street, which will be 6m in width and 21m in length (point 16). A second site entrance is proposed immediately opposite on the south side of the railway (points 22 and 23). These areas are situated close to the site of a former medieval house and barn that was rebuilt in the late post-medieval period (see 2014 ES, Appendix 6A and Figure 12.1) and as such remains associated with the structure, such as pits and wells, could underlie this section of the site.
- 10.2.20 To the immediate east, a narrow construction access road is proposed that will run along the north side of the Proposed Scheme as far as the A21 Robertsbridge bypass (point 28).
- 10.2.21 To the immediate east of the above, construction entrances are proposed either side of the A21 Robertsbridge bypass (points A1, A2 and 56), the eastern example again being 6m wide and 21m long. From that point, the construction access road will continue to the east, while a narrow access and egress road will run northwards at a right-angle to the proposed railway line before connecting with Church Lane (point 45). Immediately opposite this on the south side of the railway, a small rectangular construction access area is proposed (points 38, 46 and 47).
- 10.2.22 Any changes caused by these works will be temporary, with the landscape being fully reinstated upon completion of the Proposed Scheme, and as such their magnitude upon the setting of any heritage assets in the area will be negligible. Consequently, regardless of the significance / sensitivity of the heritage asset, the anticipated impact is deemed to be negligible. As such the effect will be insignificant.
- 10.2.23 Any below-ground works associated with these proposed changes will consist of a topsoil strip that is unlikely to be of a depth that will impact upon any potential archaeological resources, including those potential assets that are associated with the aforementioned medieval house and barn. Even if this were the case, it seems unlikely that the resource would be removed in its entirety and as such the predicted magnitude of the works is deemed to be negligible to low at worst. Regardless of the significance / sensitivity of the below-ground archaeological resource, the impact is therefore deemed to be negligible to minor at worst. As such, the effect will be insignificant to minor adverse at worst.

10.3 Continued validity of assessment

- 10.3.1 If the ES was undertaken today, there would be methodological changes to the ways in which terms and quantification criteria are presented. Few changes have occurred to the baseline data. Minor changes to the construction scheme have taken place, consisting of the construction of temporary site entrances and temporary construction access areas in the Robertsbridge area. However, these differences are not expected to significantly impact upon the below-ground archaeological resource or the setting of archaeological assets beyond the construction phase, including Robertsbridge Abbey. Consequently, they do not change the nature of the conclusions that are presented in the ES. As such, the ES is considered to be adequate.

11.0 Archaeology and Cultural Heritage (built heritage)

11.1 Specialist experience

- 11.1.1 Guy Thompson, Associate Chartered Institute for Archaeologists (ACIfA) is an historian and historic landscape specialist with over 15 years' experience in commercial archaeology. He has expertise regarding the redevelopment of former railway sites, having been involved with the Stratford Railway Works, the redevelopment of King's Cross Central and various historic landscape and built heritage projects for HS2.

11.2 Review of existing ES and Addendums

- 11.2.1 This review and validation exercise considers the impact of the Proposed Scheme on Archaeology and Cultural Heritage as set out in Chapter 12: Archaeology and Cultural Heritage of Volume 2 of the 2014 ES. The scope of this assessment is outlined in Section 5: Archaeology and Cultural Heritage of Volume 3 (Technical and Supporting Report) of the 2014 ES. This review focuses upon built heritage assets, including designated assets (Listed Buildings and Conservation Areas) and non-designated buildings.

Policy and regulations

- 11.2.2 The Archaeology and Cultural Heritage assessment was written in accordance with Government guidance on archaeology and planning contained within the National Planning Policy Framework (NPPF 2012) and the Planning Practice Guide (March 2010), which was originally published with Planning Policy Statement 5 (2010) but which continued to be endorsed by the Government after the introduction of the NPPF. These documents were current at the time that the assessment was written but have since been superseded. The assessment references the relevant paragraphs of the NPPF relating to the historic environment and provides extracts of salient content.
- 11.2.3 NPPF standards and guidance relating to the historic environment have been updated twice since the assessment was compiled. Current government guidance on archaeology and planning is contained within the National Planning Policy Framework (revised February 2019),³⁴ whilst up-to-date advice on 'enhancing and conserving the historic environment' can be found in guidance published by the Ministry of Housing, Communities and Local Government (July 2019).³⁵
- 11.2.4 Policies mentioned in the assessment include those outlined in paragraphs 17, 128, 132, 135 and 195 of the 2012 iteration of the NPPF. The current version of the NPPF outlines policies relevant to the historic environment in paragraphs 187 to 202.
- 11.2.5 The assessment also summarises local planning policy concerning the historic environment. Reference is made to the relevant 'saved' policies of the Rother District Local Plan (2006) and to those outlined in the emerging Local Development Framework: Core Strategy. The latter document was adopted by the Council in September 2014, after the assessment was written, although the policies contained within remain unchanged

³⁴ <https://www.gov.uk/guidance/national-planning-policy-framework/16-conserving-and-enhancing-the-historic-environment>

³⁵ <https://www.gov.uk/guidance/conserving-and-enhancing-the-historic-environment>

from those cited in the ES. The assessment provides a full summary of the policies relevant to the present application.

Methodology and best practice

- 11.2.6 **PROFESSIONAL STANDARDS:** The assessment methodology was prepared in accordance with professional standards and guidance supplied by the Institute for Archaeologists (IfA), as set out in its *Standard and Guidance for Archaeological Desk-Based Assessment* (2012). This guidance has subsequently been revised by the Chartered Institute of Archaeologists (CIfA) and is presented in *Standard and Guidance for Historic Environment Desk-Based Assessment* (2014, updated 2017). The implications of these revisions for the assessment are discussed in the review of the archaeological aspects of the Archaeology and Cultural Heritage chapter of the ES (Section 10).
- 11.2.7 **SCOPE:** The scope for the assessment of the archaeological and cultural heritage resource was defined by the Scope & Methodology Report (October 2013), which is presented in Volume 3 of the 2014 ES. Paragraph 5.1.4. of this document stated that the archaeology and cultural heritage assessment should exclude “listed buildings, locally listed buildings, parks and gardens and conservations areas, which will be assessed in Chapter 10” [i.e. the section of the report addressing the Landscape & Visual Impacts of the Scheme]. Accordingly, the scope for the Landscape & Visual Impacts assessment specified that key landscape or visual considerations should include “views from the Listed Buildings, Conservation Areas and Scheduled Monuments adjacent to the site, particularly from within the setting of the Listed Robertsbridge Abbey” (Volume 3 paragraph 10.1.2). However, it went on to state that “Impacts on the settings to [*sic.*] these features will be considered in more detailed in Section 5: Archaeology and Cultural Heritage” (paragraph 10.1.3).
- 11.2.8 The latter specification was not included in the scope for the archaeological and cultural heritage assessment outlined in Volume 3, nor was it referenced in Chapter 12 of Volume 2 of the 2014 ES. Consequently, the impacts of the Proposed Scheme upon the settings (and therefore the sensitivity/significance) of Conservation Areas and Listed Buildings were not considered in the Archaeology and Cultural Heritage chapter, although they have been assessed for the present review and are presented in the Appendix E, **Table 1** and are summarised below.

Aims, Objectives and assessment methodology

- 11.2.9 The aims of the assessment were outlined in the introduction to Chapter 12 (Volume 2 paragraph 12.1.2 of the 2014 ES). These included: establishing whether the study area includes, or has the potential to include, assets of archaeological interest and to determine their significance; identifying impacts generated by the Proposed Scheme on such assets; suggesting measures that might be implemented to safeguard any significant assets or mitigate any impacts; identifying any residual effects of the Proposed Scheme. This is a useful summary of the aims and objectives of the assessment, although it is customary to discuss the methods by which these criteria are assessed in the ‘methodology’ section of a report.
- 11.2.10 The criteria used to assess the sensitivity/significance of heritage assets, to determine the magnitude of impacts and to determine the significance of effects are typically presented in a tabular format as part of the ‘methodology’ section of an assessment. By using a standardised assessment methodology and normative terminology, it is possible to assess

the validity of a report's analysis against agreed criteria. Whilst these are not set out formally in the 'methodology' section of Chapter 12, they are outlined in the Scope & Methodology Report in Volume 3 of the 2014 ES. These criteria are used to describe and quantify the results of the assessment in the concluding sections of the report (Section 12.4).

- 11.2.11 The ES itemises the sources used to compile the baseline. These include data supplied by the East Sussex Historic Environment Record (ESHER) for a search area of 1km either side of the Proposed Scheme, aerial photographs, historic maps, relevant published secondary literature and a site walkover survey. The selected search radius is sufficiently extensive to have captured all the known heritage assets that might reasonably be expected to be impacted upon by the Proposed Scheme.

Baseline

- 11.2.12 The archaeological baseline conditions are described in Section 12.3 of Chapter 12 in the 2014 ES. This account is derived from information compiled from the ESHER, British Geological Society data, the English Heritage (now Historic England) NMR aerial photographic database, other relevant published sources and a site visit.
- 11.2.13 A descriptive summary of the historical map regression is presented in Appendix 6B of 2014 ES, Volume 2. Owing to the temporary closure of the East Sussex Records Office at the time that the assessment was prepared, it was not possible to compile a comprehensive sequence of historical maps, however an extensive selection of maps has been provided in the Appendix A *GroundSure EnviroInsight Report including Historical Ordnance Survey Map Extracts, September 2013* of the Preliminary Land Quality Risk Assessment (2014 ES, Volume 3).
- 11.2.14 Ten historical maps were selected for review, although only one is reproduced within the appendix to Volume 2 (Figure A2.7.1. 1874 Ordnance Survey 1:10,560) and one large-scale Ordnance Survey map from 1930 is reproduced in Volume 4 (Figures 2.5a-e). The systematic map regression in Appendix A of the Preliminary Land Quality Risk Assessment (ES Vol 3) informs the historical background account presented in the baseline section of Chapter 12. This period-based account is concise and generally well-written.
- 11.2.15 A gazetteer of archaeological sites and monuments data supplied by the ESHER is provided in Appendix 6A of 2014 ES Volume 2 and their locations are plotted on Figure 12.1 of Volume 4 of the 2014 ES. These records include several non-designated built heritage assets, including Robertsbridge Station (item 7), Junction Road Halt (item 19), the remains of an historic bridge (item 41) and three Second World War pillboxes (items 59, 60 and 61). The assessment implicitly concludes that the settings of these assets did not contribute greatly to their significance and/or that they were not likely to be impacted upon by the Proposed Scheme (Chapter 12 paragraph 12.4.5).
- 11.2.16 Appendix 6A does not contain records of Listed Buildings and Conservation Areas, although the locations of these are plotted in Figure 2.3 (Environmental Features) of Volume 4. A list of those designated historic buildings considered most likely to be impacted upon by the Proposed Scheme is supplied in Appendix E to this review. The locations of these buildings are shown in Figure 1, Appendix E.

- 11.2.17 Given the stipulation that impacts of the Scheme upon the settings of Listed Buildings, Conservation Areas and Scheduled Monuments should be considered as part of the archaeological and cultural heritage assessment (paragraph 1.2.8 above), Appendix D includes brief descriptions of the settings of these heritage assets, analysis of their contributions to the significance of these heritage assets, assessments of the effects of the Proposed Scheme upon them and of the significance of those effects in the short, medium and long-terms.

Changes to the Proposed Scheme design and construction

- 11.2.18 Since the 2014 ES was published, several minor changes have been made to the Proposed Scheme design and construction programme at the west end of the Proposed Scheme, which lies adjacent to the southern extent of the Northbridge Street Conservation Area. The locations of these are indicated on Figure 2, Appendix D to this review. These involve temporary land take for the duration of the construction phase, which will be reinstated upon completion of the Proposed Scheme. These include:
- Point 16: A site entrance, 6m in width and 21m in length, is proposed on the east side of Northbridge Street adjacent to Salisbury House;
 - Points 22 and 23: A construction access point to be established on the north bank of the River Rother, southeast of Point 16 on the south side of the proposed reinstated railway embankment;
 - Point 28: A construction access road to be established along the north side of the proposed rail corridor between Point Y and the west side of the A21 Robertsbridge bypass;
 - Points A1, A2 and 56: construction entrances on either side of the A21 Robertsbridge bypass; and
 - Points 45, 38, 46 and 47: A construction access road (point 45) to be established to the east of the bypass, running south from Church Road at right angles to the proposed railway line. On the south side of the reinstated railway embankment it is proposed to establish a small rectangular construction access area (points 38, 46 and 47).
- 11.2.19 The impacts of these works upon the Listed Buildings of the Northbridge Street portion of the Conservation Area are expected to be temporary and the landscape will be fully reinstated upon completion of the Proposed Scheme. The magnitude of these impacts upon Listed Buildings in Northbridge Street is described in paragraphs below and in Appendix E.

11.3 Continued validity of assessment

- 11.3.1 An HER search undertaken in April 2020 in association with the present review produced 102 Listed Buildings and one Conservation Area (Robertsbridge-Northbridge Street) located within the search area. For the purposes of this review, 33 listed buildings and the Northbridge Street portion of the Conservation Area were identified as being potentially susceptible to impacts of the Proposed Scheme (Figure 1, Appendix E). The selection was informed by information and imaging supplied in the Landscape and Visual Impacts chapter of the 2014 ES (Volume 2, Chapter 8), by publicly available online mapping,

satellite and aerial photographic imaging (Google Earth) and interactive panoramas supplied by Google Street View. This information is necessarily subject to the limitations of these sources and is not supported by a recent site visit. It is not thought that the settings and therefore significance of the Listed Buildings in central Robertsbridge (High Street and Fair Lane west of the A21) and those east of Junction Road in Ewhurst would be affected by the Proposed Scheme.

- 11.3.2 The potential impacts of the Proposed Scheme on these assets, as well as its potential operational and residual effects are outlined in Appendix E, **Table 1**. It was found that the setting of all listed properties in the Northbridge Street portion of the Conservation Area made a positive contribution to their significance. Those located on the northwest side of Northbridge Street were of medium significance (Grade II listed), whilst those on the southeast side of the street were predominantly of medium significance, except for the fifteenth century timber framed house known as Monks Cottage, Rother View and Ye Olde Monk's House (Grade II* listed), which was a high significance heritage asset.
- 11.3.3 The magnitude of the impact of the Proposed Scheme upon the designated heritage assets on the northwest side of the street (nos 102-107 in Appendix E, Figure 1) is expected to be negligible-to-minor, with slight changes in noise levels, construction traffic and minor visual impacts anticipated during the construction phase, representing a neutral-to-slight adverse effect in the short term. The Proposed Scheme is not expected to impact upon these assets during the operational phase. The magnitude of the impact of the Proposed Scheme upon the listed buildings on the southeast side of Northbridge Street is predicted to be slightly greater, at least during the construction phase. Here, it is anticipated that the impact of the Proposed Scheme will be generally minor, with increased noise levels, construction traffic and slight visual impacts occurring in the short term, representing a temporary slight-to-moderate adverse effect. This will soften over time to a neutral-to-slight adverse effect.
- 11.3.4 The reinstatement of the railway is expected to have a negligible impact upon Redlands Farm (nos 114 and 115 in Appendix E, Figure 1) and Moat Farm (nos 132 and 133 in Appendix BH, Figure 1), both of which contain designated heritage assets of medium significance. Whereas a neutral-to-slight adverse effect may be expected at both locations during the construction phase, the effects of the Proposed Scheme during the medium and long terms are forecast to be neutral. Less affected still is Salehurst Park Farm, a farmstead that originated during the Middle Ages which contains four Grade II listed buildings of medium significance (nos 119 to 122 in Appendix E, Figure 1). The Proposed Scheme is not expected to impact upon these heritage assets during the short, medium and long terms.
- 11.3.5 The historic village of Salehurst contains nine designated heritage assets, eight of which are of medium significance (nos 123, 124, 126 to 131 in Appendix E, Figure 1), the ninth being the Grade I listed parish church of St Mary (no. 125 in Appendix E, Figure 1). The compact and tranquil setting of the village makes a positive contribution to the significance of these assets. It is envisaged that the Proposed Scheme will have a negligible-to-minor impact upon the listed buildings and structures situated on the north side of Church Road and a minor impact upon those on the south side of the road. The effects of the construction phase of the Proposed Scheme are expected to range from neutral to slight adverse. It is conceivable that when operational, the reinstated railway may have a slight beneficial effect upon the Salehurst Halt Public House (no. 129 in Appendix E, Figure 1).

- 11.3.6 The remains of Robertsbridge Abbey are a Scheduled Monument and contain three listed structures (nos 116 to 118 in Appendix E, Figure 1). The impact of the Proposed Scheme upon the Scheduled Monument was addressed in full by the Archaeological and Cultural Heritage assessment. Of the listed structures at this location, two are of high significance (Grade I and II*) and the third of medium significance. The settings of these assets are considered to make a positive contribution to their significance. It is expected that the Proposed Scheme will have a moderate impact upon these assets, with moderate-to-large adverse effects occurring during the construction phase and slight-to-moderate adverse effects during the operational phase.
- 11.3.7 It should be remembered that despite the impacts that have been identified during the Proposed Scheme's construction and operational phases, it involves the reinstatement of an historical railway line which was extant for a period of more than sixty years. Significant stretches of the railway embankment survive in-situ to the east of Salehurst, its presence in the landscape marked by a screen of largely mature trees. Historical maps (in Appendix A of the Preliminary Land Quality Risk Assessment (ES Volume 3)) indicate that the sections of the railway embankment southwest of Salehurst that ran along the north bank of the River Rother at Northbridge Street was still in existence during the 1970s, when it would have been visible from heritage assets in both these locations.
- 11.3.8 Were the ES to be produced today, the archaeological and cultural heritage assessment would probably be more formally structured and make consistent use of terminology and quantification criteria. A comprehensive historical map regression would be provided as an appendix to the assessment rather than as an appendix to the Preliminary Land Quality Risk Assessment (2014 ES Vol 3). The analysis of setting, significance, magnitude of impacts and determination of the significance of effects upon heritage assets would be presented in a more systematic fashion, like that used in Appendix E, **Table 1** to this review.

12.0 Transport and Access

- 12.1.1 Please refer to the standalone Rother Valley Railway. Review of Traffic and Transport Chapter. Mott MacDonald. March 2021 in Appendix F.

13.0 Socio-Economics

13.1 Specialist experience

- 13.1.1 Mark Teasdale is a Senior Director of Temple Group Ltd. He has over 30 years' experience as a socio-economics expert. He has an MA in Philosophy, Politics and Economics and a master's in Public Affairs/ Urban and Regional Planning. He is a full member of the Institute of Economic Development.

13.2 Introduction

- 13.2.1 This note considers the findings from the Rother Valley Railway Reinstatement Project ES chapter 14 on Socio-economics (the ES chapter) originally submitted in June 2014. It provides an update to the planning policy context and to the assessment of baseline socio-economic conditions.
- 13.2.2 The note also considers the ES chapter's assessment of socio-economic effects alongside the main findings from the Rother Valley Railway Economic Impacts Report prepared by Steer in September 2018.

13.3 Planning policy context

- 13.3.1 The National Planning Policy Framework 2019 has been published since the ES. It leads with a presumption in favour of sustainable development and sets out three objectives of sustainable development. The economic objective outlined at paragraph 8 a is "to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure."
- 13.3.2 In relation to the rural economy, paragraph 83 c notes that planning policies and decisions should enable "sustainable rural tourism and leisure developments which respect the character of the countryside."
- 13.3.3 Two development plan documents form the local plan for Rother District. These are the Core Strategy, September 2014 and the Development Sites and Allocations Local Plan, which was adopted in December 2019. In the portrait of the District in the Core Strategy, Rother is described as poor in relation to East Sussex, which in turn is poor in relation to the South East Region. One of the main issues identified for attention in the Plan is the need to secure economic improvement and better access to jobs and services.
- 13.3.4 The strategic objective for rural areas is "to meet local needs and support vibrant and viable mixed communities in the rural areas, whilst giving particular attention to the social, economic, ecological and intrinsic value of the countryside." (paragraph 12.5)
- 13.3.5 Both this and the general objectives for rural areas make the link between community health and economic viability: iii) "To support sustainable local employment opportunities and the economic viability of rural communities; xii) To support sustainable tourism and recreation, including improved access to the countryside." (paragraph 12.6).

- 13.3.6 In the Rural Areas section of the Core Strategy, Robertsbridge is described as a village particularly in need of additional employment (Policy RA1). Policy RA2 singles out tourism as one of three sectors which justify development in the rural areas. Support for tourism development in the countryside is provided again in Policy RA3.

13.4 Baseline

- 13.4.1 The ES chapter considers baseline information on population, unemployment and deprivation for a local impact area based on the 2011 boundary for Salehurst ward in Rother District Council. Since the publication of the ES there have been ward boundary changes in Rother, with Salehurst no longer forming a defined ward.
- 13.4.2 The geographic area previously covered by Salehurst ward now straddles the 2019 boundaries for Robertsbridge ward and for Hurst Green & Ticehurst ward.
- 13.4.3 Notwithstanding these boundary changes, it is still possible to obtain data from the National Online Manpower Information Service (NOMIS) for areas based on 2011 ward boundaries. The latest NOMIS data shows a working age population for 2019 of 2,660 for this geography.
- 13.4.4 In January 2021 there were a total of 140 people in the local impact area claiming out of work benefits. This represents a claimant rate of 5.2% for the local impact area, compared with 5.7% for Rother District and 6.2% for Great Britain. The local impact area has the eighth highest claimant rate of the 20 wards across Rother District based on 2011 ward boundaries.
- 13.4.5 The ES chapter baseline assesses deprivation in the local impact area using the English Indices of Deprivation 2010. The deprivation indices have subsequently been updated twice, first in 2015 and then again in 2019.
- 13.4.6 The English Indices of Deprivation 2019 (EID 2019) enable comparisons to be made for a range of deprivation indicators at the small area level. The small areas, or neighbourhoods, are known as lower level super output areas (LSOAs) which on average contain around 1,500 people. There are 32,844 LSOAs in England.
- 13.4.7 The EID 2019 provides an overall index of multiple deprivation which is based on seven separate deprivation domains. Each deprivation domain is weighted, as shown below:
- **Income deprivation** – with a weighting of 22.5%;
 - **Employment deprivation** – with a weighting of 22.5%;
 - **Education, skills and training deprivation** – with a weighting of 13.5%;
 - **Health deprivation and disability** – with a weighting of 13.5%;
 - **Crime** – with a weighting of 9.3%;
 - **Barriers to housing and services** – with a weighting of 9.3%; and
 - **Living environment deprivation** (9.3%).

13.4.8 **Table 13.1** summarises deprivation for the three LSOAs in the local impact area.

Table 13.1 – Deprivation in the local impact area

Deprivation score (% rank)	Rother 001A	Rother 001B	Rother 001C
Index of Multiple Deprivation	27,632 (84.1%)	14,958 (45.5%)	25,087 (76.4%)
Income	23,850 (72.6%)	14,073 (42.8%)	18,865 (57.4%)
Employment	25,042 (76.2%)	13,032 (39.7%)	26,461 (80.6%)
Health and disability	27,358 (83.3%)	22,518 (68.6%)	26,981 (82.1%)
Education, skills and training	25,017 (76.2%)	16,672 (50.8%)	19,993 (60.9%)
Barriers to housing and services	14,888 (45.3%)	6,336 (19.3%)	25,645 (78.1%)
Crime	30,747 (93.6%)	22,442 (68.3%)	28,187 (85.8%)
Living environment	17,325 (52.7%)	7,980 (24.3%)	9,252 (28.2%)

13.4.9 The total population of these three LSOAs was 4,699 in 2019, broken down as follows:

- Rother 001A – 1,438;
- Rother 001B – 1,717; and
- Rother 001C – 1,544.

13.4.10 **Table 13.1** confirms the conclusion in the 2014 ES chapter that the local impact area is not deprived by national standards.

13.4.11 Rother 001B, which covers the eastern half of the local impact area, is the 23rd most deprived of the 58 LSOAs in Rother District. On the overall Index of Multiple Deprivation (IMD), Rother 001B is in the most deprived 45.5% of local areas nationally.

13.4.12 The only deprivation domain in the local impact area which features in the most deprived 20% nationally is the barriers to housing and services domain. This measures the physical and financial accessibility of housing and local services. Rother 001B is in the most deprived 19.3% of local areas in England on this domain and is the 17th most deprived of the 58 LSOAs in Rother District.

13.5 Socio-economic effects

- 13.5.1 The 2014 ES chapter identified no significant effects, positive or negative, arising from the Proposed Scheme, concluding in paragraph 14.7.4 that “overall the Scheme in terms of socio-economic impacts is neutral to minimal positive.”
- 13.5.2 The 2014 ES chapter identified no mitigation requirements nor residual socio-economic effects. There were no cumulative socio-economic effects reported by the 2014 ES chapter.
- 13.5.3 **Table 13.2** below summarises the socio-economic effects identified by the 2014 ES Chapter.

Table 13.2 – Socio-economic effects of the Proposed Scheme, as reported in the 2014 ES

Socio-economic effect	Scale	Significance
Construction phase		
Construction employment	20 to 25 job years of employment during a construction phase lasting 18 to 24 months	Minor positive
Spend by construction workers	Some possible limited spend at local construction suppliers and overnight stays by specialist construction workers	Minor positive
Operational phase		
Additional tourism	Improved connectivity for inward tourism that would translate into a small increase in local jobs in this sector	Minor positive
Level crossing traffic delays	Total economic cost over the operational season of traffic delays due to new level crossings on the A21 and on the B2244 of between £2,430 and £5,337 depending on the length of road closure. It should be noted that these costs were based on work undertaken by Mott MacDonald in 2014. They would need to be adjusted upwards using the Consumer Price Index (CPI) to give a cost at 2021 prices.	Minor negative

- 13.5.4 Notwithstanding the point about the need to adjust the values of the costs associated with traffic delays at level crossings to reflect price inflation over time, the conclusions of the ES chapter remain valid.
- 13.5.5 However, the likely positive effects of additional visitor spending are considered but not explicitly measured by the ES chapter. These could well be a significant positive effect of the Proposed Scheme and are considered in more detail by the Steer report on the Rother Valley Railway Economic Impacts.

13.6 Rother Valley Railway Economic Impacts (the Steer report)

- 13.6.1 The work by Steer published in September 2018 has a wider brief than the ES chapter. Its purpose is to assess the direct, indirect and induced economic impacts of both the Rother Valley Railway Reinstatement Project (the Proposed Scheme) and the wider Kent and East Sussex Railway (KESR) investment programme that would be unlocked by the completion of the missing link of the Rother Valley Railway between Bodiam and Robertsbridge.
- 13.6.2 The core impact area used by the Steer study in the measurement of economic benefits is Rother District, although some economic impacts also estimated at regional and national scale.
- 13.6.3 **Table 13.3** below summarises the main economic impacts identified by the Steer report for the Rother Valley Railway Reinstatement Project.

Table 13.3 – Core economic benefits of the Rother Valley Railway Reinstatement

Economic benefit	Scale	Value (2018 prices)
Construction phase		
Construction employment	34 job years of employment during a construction phase lasting 18 to 24 months	£6.48 million in total over two years, based on construction spend of £4.88 million net of land acquisition costs plus multiplier effects
Operational phase		
Additional visitor spend	22,000 additional day visitors per annum spending an average of £42:55 per visit at 2018 process, plus multiplier effects	£1.061 million per annum
Additional volunteer spend	Two additional volunteer days per day of operation (178 days per year) and assuming that 10% of the additional volunteers would come from outside Rother and require overnight accommodation	£1,900 per annum
Operational jobs	1.5 days of additional paid staff time per day of operation (178 days per year). The jobs would be in retail and catering at Robertsbridge Station.	£17,900 per annum

13.7 Summary

- 13.7.1 The findings from the ES chapter and the Steer report are broadly consistent, although the two studies have assessed effects at different spatial scales. This reflects the fact that the briefs behind the two pieces of work were quite different.
- 13.7.2 The main driver of the economic value attributed by the Steer report to the Proposed Scheme is the additional tourism demand that would be generated by connection to the mainline railway network at Robertsbridge Station.

-
- 13.7.3 The Steer report central case values for additional visitor spend are driven by an estimated 22,000 extra visitors each year. The additional annual visitor numbers are based on modest and entirely plausible uplifts of 15% in passengers on the KESR and of 5% in the number of visitors to Bodiam Castle.
- 13.7.4 The Steer report takes a prudent and well evidenced approach in the assumptions that it makes in selecting the appropriate multipliers to estimate the indirect and induced economic benefits that will flow from the direct effects of the Proposed Scheme.
- 13.7.5 Overall, my professional judgement is that the Steer report is a robust and well considered assessment of the potential economic impacts of completing the missing link between Bodiam and Robertsbridge stations.

14.0 Land Use and Agriculture

14.1 Specialist experience

- 14.1.1 The review has been undertaken by Peter Williams who is an Associate (and former Director) of Reading Agricultural Consultants Ltd. He holds an Honours Degree in Agriculture from the University of Reading and is a Fellow of the British Institute of Agricultural Consultants. Peter has extensive experience in the preparation of ES Land Use and Agriculture chapters including for: HS2 Phases 1, 2a and 2b; and numerous Highways England schemes including works to the A303, A30 and A38 trunk roads.

14.2 Review of existing ES and Addendums

Policy and regulations

- 14.2.1 The published ES covers all relevant policy and regulations, save to note that a revised NPPF was published in February 2019 and paragraph references in the ES need to be updated. Paragraph 170 (as opposed to 112 of the 2012 NPPF) now deals with need to take into account:

“the economic and other benefits of the best and most versatile agricultural land...”

- 14.2.2 The 2006 Rother Valley Local Plan still remains in force, and all references made to that document remain valid.

Methodology and best practice

- 14.2.3 The methodology and assessment used in the ES aligns with current best practice.

Baseline

- 14.2.4 The baseline information with regard to both soils and land holdings (based, as it was on a desk assessment) remains entirely valid for the purpose of the ES. However, there is now further information available for the land holdings to enable a more robust assessment to be completed. Specifically, the holdings that would be affected by the permanent and temporary construction works in 2020 are:

Parsonage/ Redlands Farm

- 14.2.5 This holding is understood to extend to at least 140ha, with some 75ha associated with Parsonage Farm (to the north of the Rother River) and 65ha with Redlands Farm (to the south of the river); it is understood that considerable further areas of land are leased. Cropping includes arable and hop crops with grazing livestock (unspecified). There is also a farm shop (Busters Farm Produce) at Parsonage Farm.

Moat Farm

- 14.2.6 Moat Farm is understood to extend to some 92ha and is a pasture farm for grazing cattle and sheep. It falls within the Natural England's Higher Stewardship Scheme and conservation plays a major part in the farming policy and the general running of the farm. There are approximately 80ha north of the railway bed; 12ha to the south.

- 14.2.7 A third holding, consisting solely of pasture land located south-east of Salehurst and south of the River Rother would only be affected by temporary rights of entry for survey purposes and site investigation.

Changes to the Proposed Scheme design and construction

- 14.2.8 The only changes in relation to the Proposed Scheme design relate to additional areas of temporary land acquisition associated with construction phase access and working areas. The effect of these additional temporary areas of land acquisition are considered in section 14.3.
- 14.2.9 It is currently proposed that five 'at level crossings' (ALCs) will be provided as mitigation to maintain access to land severed by the Proposed Scheme. However, an unmitigated scenario without any accommodation access is also considered in section 14.3 as a worst-case scenario.

14.3 Continued validity of assessment

- 14.3.1 In view of the above changes in the baseline information available and the changes to the Proposed Scheme design and construction, it is considered that there needs to be a revised assessment of the effects on the land holdings. The assessment of the effect on agricultural soil remains entirely valid, subject to slight amendments to the areas of land required temporarily and permanently.
- 14.3.2 In terms of the impact on agricultural land and soil, during construction a total of 7.51ha of land will be directly affected by the works, of which 2.04ha is required temporarily during construction. Much of the remaining area of permanent land take forms part of the former railway embankment and is covered with trees. Based on the assumption that all the land required from agricultural holdings is Subgrade 3b, a total of 7.51ha will be removed during the construction period. Insofar as lower quality agricultural land is not considered a high sensitivity receptor (see **Table 15.1** in the 2014 ES), the loss of this area of land is assessed as an impact of minor magnitude (see **Table 15.2** in the 2014 ES); overall this leads to a **slight adverse effect** (see **Table 15.4** in the 2014 ES).

Parsonage/ Redlands Farm

- 14.3.3 The area of land to be acquired from Parsonage/Redlands Farm is:
- 6.53ha in total, of which:
 - 3.12ha is required permanently;
 - 1.01ha is required temporarily during construction; and
 - 2.39ha is required for survey and site investigation purposes only.
- 14.3.4 Although the area of land required as a percentage of the total area managed in overall terms is small (less than 5%), the severance of the farm by the track will inevitably lead to changes of management for some of the fields from arable cropping to livestock grazing. It is understood that provisions are to be included by way of improved agricultural links to ensure access to severed land (set out in the Scheme drawings).

- 14.3.5 As such the overall effect on the farm remains small with a total of 4.13ha required for construction and 3.12ha required in perpetuity. This represents less than three percent of the overall area farmed and the existing land uses (with arable cropping and grazing) will continue. In such circumstances the effect is assessed as a slight to negligible adverse effect.
- 14.3.6 Should the ALCs not be provided the area of land required would remain the same, albeit access to some of the fields would be more problematic – but still possible. Whilst some of the fields would probably revert to permanent pasture for grazing by livestock, an agricultural use would still be possible (any reduction in income would be dealt with under the compensation code, but this falls out with the purview of the ES). In the alternative, the landowners may choose to use the land for conservation.

Moat Farm

- 14.3.7 The area of land to be acquired from Moat Farm is:
- 4.40ha in total, of which:
 - 2.34ha is required permanently;
 - 1.03ha is required temporarily during construction;
 - 1.03ha is required for survey and site investigation purposes only.
- 14.3.8 The area of land that would be required during the construction phase is 3.37ha with 2.34ha required in perpetuity. As access to some of the severed land would be impossible (without mitigation) this would increase the area of land required to some 14.34ha and represents 16 percent of the holding. In such circumstances the impact is assessed as a slight adverse effect.
- 14.3.9 Should access to the severed land be provided (by the provision of the ALCs) the area of land required in perpetuity would be 2.34ha. This represents less than four percent of the overall area farmed and that the existing land uses (mainly livestock grazing) will continue. In such circumstances the effect is assessed as a slight to negligible adverse effect.

15.0 Human Health

15.1 Specialist experience

- 15.1.1 Ellie Holderness is an EIA consultant with Temple Group. She has a BSc (Hons) in Geography and is a Practitioner member of the Institute of Environmental Management and Assessment. Ellie has over four years' experience in the co-ordination of EIA and undertaking environmental appraisal work.

15.2 Introduction and Scope of Assessment

- 15.2.1 This chapter of the ES assesses the likely significant effects of the Proposed Scheme in terms of human health.
- 15.2.2 The chapter describes: the policy context relevant to human health considerations; the assessment methodology; the baseline conditions currently existing for the study area; the likely significant effects; the mitigation measures required to prevent, reduce or offset any significant adverse effects and the cumulative effects associated with the Proposed Scheme in combination with other developments within proximity of the Site.

15.3 Key Legislation, Policy and Guidance Considerations

- 15.3.1 The human health assessment has been undertaken within the context of relevant planning policies, guidance documents and legislative instruments. These are summarised below.

National Legislation and Regulation

Health and Social Care Act

- 15.3.2 Health and Social Care Act (2012) introduced a duty upon local authorities to *"take such steps as it considers appropriate for improving the health of the people in its area"*. This can include requiring Health Impact Assessment (HIA) for policies, plans and projects.

National Planning Policy Framework (NPPF)

- 15.3.3 One of the three main objectives of NPPF is to *"support strong, vibrant and healthy communities"*. The NPPF states that planning policies and decisions should ensure that development:

"enable and support healthy lifestyles, especially where this would address identified local health and well-being needs – for example through the provision of safe and accessible green infrastructure, sports facilities, local shops, access to healthier food, allotments and layouts that encourage walking and cycling".

- 15.3.4 The NPPF advocates an integrated approach to planning so that the location of housing, economic uses and community facilities and services are considered together.

- 15.3.5 In Chapter 8 the NPPF states:

"Planning policies and decisions should aim to achieve healthy, inclusive and safe places which:

a) promote social interaction, including opportunities for meetings between people who might not otherwise come into contact with each other – for example through mixed-use developments, strong neighbourhood centres, street layouts that allow for easy pedestrian and cycle connections within and between neighbourhoods, and active street frontages;

b) are safe and accessible, so that crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion – for example through the use of clear and legible pedestrian routes, and high-quality public space, which encourage the active and continual use of public areas; and

c) enable and support healthy lifestyles, especially where this would address identified local health and well-being needs – for example through the provision of safe and accessible green infrastructure, sports facilities, local shops, access to healthier food, allotments and layouts that encourage walking and cycling”.

- 15.3.6 Access to high quality open spaces and opportunities for sport and recreation can make an important contribution to the health and well-being of communities. Planning policies should be based on robust and up-to-date assessments of the needs for open space, sports and recreation facilities and opportunities for new provision (paragraph 96).

The Environmental Impact Assessment (Miscellaneous Amendments Relating to Harbours, Highways and Transport) Regulations 2017

- 15.3.7 The EIA Regulations introduced the requirement to consider the potential significant effects of projects (meeting certain thresholds) upon human health. This means that as well as identifying potential positive or negative effects, the significance of these effects on the health of people have also to be considered.

Regional Planning Policy and Guidance

Rother District Local Plan

- 15.3.8 The Adopted Core Strategy (2014) includes a number of relevant aspects. Rother and Hastings Councils' shared approach to future prosperity includes “iv) *developing the economy, healthy lifestyles and the role of culture, sports, arts, tourism and leisure*”, which is echoed in the Communities Objectives.

East Sussex County Council Local Transport Plan

- 15.3.9 The East Sussex County Council Local Transport Plan covers the period 2011 to 2026. The aim is to deliver an effective, well managed transport infrastructure with improved travel choices. The overall objectives are:
- To improve economic competitiveness and growth;
 - Improve health, safety and security;
 - Tackle climate change;
 - Improve accessibility and enhance social inclusion; and
 - Improve quality of life.

Technical Standards and Guidance

Planning Practice Guidance

- 15.3.10 The National Planning Practice Guidance (PPG): Health and Wellbeing Guidance published in 2014 and updated in 2017 provides a resource in support of the NPPF. The PPG recognised the importance of the Health Impact Assessment as a tool that helps to identify significant impacts on health and wellbeing and necessary mitigation measures to make a development acceptable in planning terms.

National Design Guide

- 15.3.11 The National Design Guide was first published in October 2019. It emphasises the importance of considering both physical and mental health to achieve well-designed developments. For instance, the National Design Guide makes mention to “*healthy, comfortable and safe internal and external environment*” in order to promote quality of life for a development’s occupants and users as well as to the beneficial impacts of compact and walkable neighbourhoods on health and wellbeing.

Health Impact Assessment in Planning

- 15.3.12 Planning and the EIA process requires the consideration of populations and human health to be undertaken. However, guidance on this area of practice is sparse, and a variety of methodologies are adopted by different practitioners. In this eighth volume of the Impact Assessment Outlook Journal, the articles explore the use of Health Impact Assessment (HIA) as a planning tool as well as the consideration of health in EIA.

Health and Environmental Impact Assessment: A Briefing for Public Health Teams in England

- 15.3.13 The May 2017 changes to the Environmental Impact Assessment (EIA) regulations clarify that ‘population and human health’ are on the list of topics that are considered in an EIA. This briefing note aims to raise awareness amongst Directors of Public Health (DsPH) and their public health teams, and those involved with the EIA process, about EIA and the May 2017 changes. It identifies when and how public health teams can contribute to the EIA process. This note is part of Public Health England’s work to describe and demonstrate effective, practical local action on a range of wider determinants of health.

15.4 Assessment Methodology and Significance Criteria

Determination of baseline

Study area

- 15.4.2 In the case of this assessment, the study area has been the set to the District of Rother (East Sussex), within which Robertsbridge and Bodiam lie. The study area has been compared with health information for the South East region and England as a whole where relevant.

Desk study

- 15.4.3 A desk-based study has been undertaken to determine the baseline of human health in the study area for the following indicators:

- Demography of the local population;
- Health statistics for the local population; and
- Healthcare provision within the study area.

15.4.4 Sources used are cited throughout the text.

Potential receptors to environmental change

15.4.5 Receptors are considered for their sensitivity to change and their ability to absorb and be resilient to changes to their environment. Receptor sensitivity is as set out in **Table 15.1**.

15.4.6 Receptors were identified as follows, inline with a review of environmental effects described in the technical chapters of the 2014 ES and the 2021 ES Update Report. Receptors chosen for the human health assessment are those that would be expected to be affected by environmental changes such as to air quality, noise, socioeconomics and traffic.

15.4.7 Those considered to be most sensitive receptors to change (of 'high' sensitivity) are those who reside close to the Proposed Scheme, and those most vulnerable to change and with the least resilience to it. These receptors include children, pregnant women, elderly people, and people with disabilities within the local population. People living within deprived areas can also be less resilient to change.

15.4.8 Those considered to be moderately sensitive ('medium') to change include residents in the local community and those of working age who are likely to spend much of their time within the area. These receptors also include local Public Rights of Way and road users that may be negatively or positively impacted by the introduction of rail crossings and associated traffic management (such as users of public transport, cyclists and pedestrians).

15.4.9 Those considered to be least sensitive receptors ('low' and 'negligible') to change are comprised of those who are transient to the area, such as tourists and locally employed people who are only in the area within working hours.

Rapid Health Impact Assessment

Assessment methodology

15.4.10 While there are no set assessment methodologies for undertaking health impact assessment as part of EIA, the NHS's Healthy Urban Development Unit's (HUDU) Rapid Health Impact Assessment Tool 2019³⁶ (Rapid HIA) is a comprehensive framework to approach HIA for developments. This methodology is adapted so that the significance of any health effects is assessed (as per EIA Regulations) by consideration of relative sensitivities of receptor groups and likely magnitude of impacts, and potential effects of negligible significance scoped out to ensure a proportionate assessment.

HIA Scoping

³⁶ NHS Healthy Urban Development Unit (2019) Rapid Health Impact Assessment Tool. Available at: <https://www.healthyurbandevelopment.nhs.uk/wp-content/uploads/2019/10/HUDU-Rapid-HIA-Tool-October-2019.pdf>.

15.4.11 In order to ensure a proportionate assessment, the scope of the Rapid HIA has been determined as follows, reviewing the HUDU assessment items for their relevance to the Proposed Scheme.

15.4.12 The following HIA items are considered to be relevant to the Proposed Scheme and will therefore be considered within the Rapid HIA.

- Access to open space and nature;
- Air quality, noise and neighbourhood amenity;
- Accessibility and active travel;
- Social cohesion and inclusive design;
- Minimising the use of resources; and
- Climate change.

15.4.13 The items identified in **Table 15.1** are not considered to be of relevance to the Proposed Scheme, and therefore have been scoped out of the assessment for the rationale provided.

Table 15.1: Scoping matrix

Rapid HIA Theme	Reason for scoping out
Housing design and affordability	The Proposed Scheme provides no housing and therefore cannot be assessed for its significance in the provision of affordable and accessible housing requirements. The lack of housing provision will not bring additional residents to the area, therefore will not add pressure to existing healthcare services.
Access to health and social care services and other social infrastructure	The Proposed Scheme provides no healthcare, social or community facilities, nor does it facilitate access to these facilities, therefore cannot be assessed for its significance in access to health and social infrastructure.
Crime reduction and community safety	The Proposed Scheme contains no measures to combat local crime nor provides security through the provision of 'gated communities' or multi-use buildings and public spaces. The Proposed Scheme will ensure that the track and its crossings are kept secure in order to prevent trespassing and crime within the development footprint; therefore, the incidence of these infractions is not expected to be significant and will not be assessed further.
Access to healthy food	The Applicant has not indicated that the Proposed Scheme will facilitate access to or the supply of local food, food retail or food takeaways, therefore the Proposed Scheme cannot be assessed for its significance in providing access to healthy food.
Access to work and training	Excluding voluntary opportunities during construction (which will be considered within the Rapid HIA), the Proposed Scheme does not facilitate access to local employment or training opportunities, nor does it provide workspace or facilities to enable local work procurement. The socio-economic assessment of the Proposed Scheme identifies that the development could provide an additional 14 full-time equivalent roles in operation; however, this scale of employment would be unlikely to have a significant impact in the context of a robust local labour market and very low local unemployment levels, therefore has been removed from the scope of the Rapid HIA.

Rapid HIA Theme	Reason for scoping out
In areas of deficiency, does the proposal provide new open or natural space, or improve access to existing spaces?	The health baseline study and Chapter 14 of the 2014 ES show that Rother is comprised of a mosaic of deprivation rankings. The District includes several LSOAs considered to be within the most deprived deciles nationally, yet those closest to the Proposed Scheme, in Salehurst, are within deciles 5 and 7 and considered to be economically robust. However, Rother is also a very 'green' district, and not deficient in open or natural space. Therefore, an assessment regarding deficiency and deprivation is not relevant.
Does the proposal provide a range of play spaces for children and young people?	The Proposed Scheme does not include proposals for play spaces for children and young people in its design, nor would these features be safe in the setting of a rail track; therefore, this item is not relevant to the assessment.
Does the proposal address the ten Healthy Streets indicators?	The Healthy Streets Approach is specific to London and is a system of policies and strategies implemented to put people and their health at the heart of decision making. Its aim is to deliver a healthier, more inclusive hub where people choose to walk, cycle and use public transport. The purpose of the Proposed Scheme is to reinstate a rail track along which rail services will run, providing a service for tourism and to provide access to local views and amenities. It does not encourage active travel or travel by public transport, therefore is not relevant to this assessment.
Does the proposal prioritise and encourage walking, for example through the use of shared spaces?	The purpose of the Proposed Scheme is to reinstate a rail track along which rail services will run, providing a service for tourism and to provide access to local views and amenities. It does not encourage active travel or travel by public transport, therefore is not relevant to this assessment. However, maintenance and enhancement of access to open and natural spaces surrounding the Proposed Scheme is an important part of the scheme and assessed under 'Access to Open Space and Nature'.
Does the proposal prioritise and encourage cycling, for example by providing secure cycle parking, showers and cycle lanes?	The Proposed Scheme will provide a service for tourism and access to local views and amenities. Its purpose is not to encourage cycling, therefore is not relevant to this assessment. However, the existing K&ESR provides for cycle storage in the service's Guard Vans, therefore encouraging the use of bikes on the development.
Does the proposal seek to reduce car use by reducing car parking provision, supported by the controlled parking zones, car clubs and travel plans measures?	The Proposed Scheme includes no measures to actively discourage transport by car, such as reductions in car parking provision or car clubs as it is primarily designed as a tourist attraction. This consideration is therefore not applicable to this assessment.
Does the proposal include a mix of uses and a range of community facilities?	The purpose of the Proposed Scheme is to provide a steam/ diesel engine service for tourism and to provide access to local views and amenities. Therefore, this question is not relevant to this assessment.
Does the proposal connect with existing communities, i.e., layout and movement which avoids physical barriers and severance and land uses and spaces which	The purpose of the Proposed Scheme is to provide a steam/ diesel engine service for tourism and to provide access to local views and amenities. It does not consider or encourage social interaction of communities therefore this question is not relevant to this assessment.

Rapid HIA Theme	Reason for scoping out
encourage social interaction?	
Does the proposal incorporate renewable energy?	The Proposed Scheme does not incorporate renewable energy into its proposals therefore this question is not relevant to this assessment.
Does the proposal ensure that buildings and public spaces are designed to respond to winter and summer temperatures, for example ventilation, shading and landscaping?	The purpose of the Proposed Scheme is to reinstate a section of former track to enable the operation of a steam/diesel engine service for tourism and to provide access to local views and amenities. It does not provide buildings or new public spaces as part of the TWAO application, therefore is not relevant to this assessment.

15.5 Prediction methodology

- 15.5.1 The assessment of health effects considers the predicted impacts of the Proposed Scheme (as described within **Chapters 6 to 15** of the 2014 ES, addenda and this 2021 ES Update Report) on the human health baseline.
- 15.5.2 Based on the HUDU tool, the human health effects of the Proposed Scheme are identified as positive, negative, neutral and uncertain as defined in **Table 15.2**.

Table 15.2: Definition of effects

Criteria	Definition
Positive	Health impacts are categorised as positive if they lead to a beneficial impact on human health such as direct effects on health, provision of access to open spaces and the provision of healthcare facilities.
Negative	Health impacts are categorised as negative if they lead to adverse impacts on human health such as direct effects to health or causing environmental changes which may lead to a decline in health. Other effects include blocking access to open space or healthcare facilities, increasing access to unhealthy food and blocking physical access to use of the Proposed Scheme to those with disabilities.
Neutral	Health impacts are categorised as neutral if they are assessed as having a low or no effect to health or quality of life.
Uncertain	Health impacts are categorised as uncertain if the assessment yields no certain prediction of a positive, negative or neutral impact to human health.

- 15.5.3 Effects will be described in terms of their significance based on professional judgement and the following prediction criteria.
- 15.5.4 The sensitivity of a receptor is generally assessed by reference to characteristics of the receptor, including: their existing state in relation to the dimension being assessed (are they already disadvantaged); their ability to absorb, avoid or mitigate the effect; and level of policy priority.
- 15.5.5 Categorisation of the sensitivity of population receptors into high, medium, low and negligible is shown in **Table 15.3**. The categorisation of sensitivity is based upon good practice and professional judgement.

Table 15.3: Receptor Sensitivity Criteria

Scale	Criteria
High	Vulnerable groups have been identified that are likely to be most affected by health effects e.g., children and pregnant women, elderly people, disabled or sick people, or those living within deprived areas. These receptors have little ability to absorb, and be resilient to, change.
Medium	Local residents and users of PRow are likely to be affected by health effects, because of the amount of time they are affected by relevant health determinants. These receptors have moderate capacity to absorb, and be resilient to, change.
Low	People travelling through an area (or only there for a few hours) are least likely to be affected by project level health effects, as they are only transitory and will have less exposure to relevant health determinants. These receptors are considered to be resilient to change.
Negligible	No or indiscernible effect predicted to receptor.

- 15.5.6 The magnitude of the impact varies between the different impacts being considered. Generally, it will depend on factors such as the scale of the receptors which experience the impact, the duration of the impact and the nature of the detriment caused (e.g., permanent or reversible).
- 15.5.7 The magnitude criteria outlined in **Table 15.4**: General criteria for assessing the magnitude of change to health determinants.
- 15.5.8 **15.4** below can be positive or negative. While there is no definitive guidance or methodology for evaluating the magnitude of changes to health determinants, the assessment takes account of good practice and professional judgement.

Table 15.4: General criteria for assessing the magnitude of change to health determinants.

Scale	Criteria
High	Health impacts are categorised as high if the effects could lead directly to a change in mortality/death or acute or chronic disease/ illness or if the effects could help prevent mortality/death or acute or chronic disease/ illness. The exposure tends to be of high intensity and/or long duration and/or over a wide geographical area.
Medium	Health impacts are considered of a medium magnitude if they cause long term nuisance impacts or the exacerbation or improvement of existing illness. The exposure tends to be of moderate intensity and/or over a relatively localised area.
Low	Health impacts are considered to be of a low magnitude if they cause a general nuisance or relate to small improvements or reductions in quality of life. The exposure tends to be of low intensity and/or short/intermittent duration.
Negligible	No or indiscernible effect predicted.

- 15.5.9 A matrix identifying how effects scale depending on receptor sensitivities and impact magnitudes is set out in **Table 15.5**. Effects of moderate and major scale are considered significant, while effects of negligible and minor scale are considered non-significant.

Table 15.5: Effect Scale Matrix

		Sensitivity of Receptor			
		<i>High</i>	<i>Medium</i>	<i>Low</i>	<i>Negligible</i>
Impact Magnitude	<i>High</i>	Major negative / positive	Major-moderate negative / positive	Moderate-minor negative / positive	Negligible
	<i>Medium</i>	Major-moderate negative / positive	Moderate-minor negative / positive	Minor negative / positive	Negligible
	<i>Low</i>	Moderate-minor negative / positive	Minor negative / positive	Minor-negligible	Negligible
	<i>Negligible</i>	Negligible	Negligible	Negligible	Negligible

15.6 Limitations and assumptions

- 15.6.1 A limitation of this study is in regard to the validity and accuracy of data and extrapolation. This study uses data from the 2011 Census data which is now dated by a decade. However, it is still considered to be the most comprehensive and reliable dataset for population demography. Where possible data has been checked against more recent sources.
- 15.6.2 Data forecasts from the 2011 Census have also been used as a basis on which to assess the effects of the Proposed Scheme on the health of the local population which may limit the validity of any assessment utilising this data.
- 15.6.3 In spite of the data limitations described above, the data used is the best available at the time of assessment and, where required, professional judgement and reasonable assumptions have been applied. Overall, the approach adopted is standard and common to all such assessments and therefore deemed appropriate.
- 15.6.4 The data used was collated before the COVID-19 pandemic, thus the assessment evaluates the effects to human health assuming a pre-lockdown baseline.
- 15.6.5 Furthermore, it should be recognised that HIA is intended to consider broader receptor groups, rather than being undertaken to consider individuals. This is due to both the fact that a fundamental determinant of health is an individual's characteristics (such as age and genetics) which is independent of the Proposed Scheme and that it is not feasible to collect data on every individual who could be directly or indirectly affected. Individuals who are particularly susceptible to health effects are included within the high sensitivity category in **Table 15.3**.
- 15.6.6 Finally, baseline data was not presented for tourist users of the railway as it is not possible to apply specific health data to them. It is assumed that they represent a cross-section of

the population, but the assessment considers them as low sensitivity as they would only experience effects associated with the Proposed Scheme for a short time.

15.7 Baseline Assessment and Identification of Key Receptors

15.7.1 This section summarises the baseline information collated regarding the local population and indicators of human health.

Summary of baseline

Demographic Profile

15.7.2 In 2018, the population of the study area (the District of Rother) was estimated as 95,656 persons³⁷. The area has exhibited a growth in population, with the latest available data showing that the estimated population grew by 0.4% from mid-2018 to mid-2019³⁸.

15.7.3 As shown in **Figure 15.1**, Rother's average age profile differs to that the South East and England in all age groups, bar 50-54 years which is similar to the regional and national average for both females and males. Rother's age profile is skewed towards older age groups, with representation of those aged from 55 to 90+ being greater than the averages of the South East and England, whilst the proportion of the local population aged 0 to 49 falls below the averages of the South East and England³⁹.

³⁷ Office for National Statistics (2020) Population projections for local authorities: Table 2. 2018 based.

<<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/datasets/localauthoritiesinenglandtable2>>

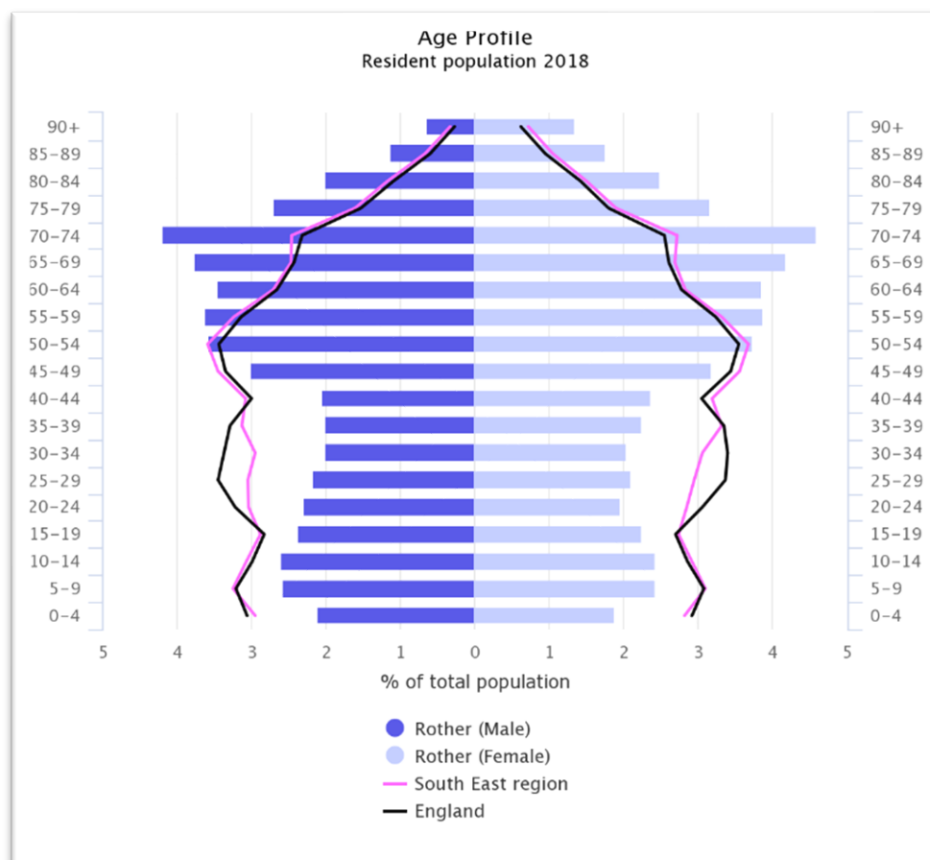
³⁸ Population change and components of change, mid-2018 to mid-2019, local authorities in the UK, ONS (2021) <

<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/mid2019estimates#local-population-change>>

³⁹ Age Profile, Resident Population (2018) < [https://fingertips.phe.org.uk/profile/health-](https://fingertips.phe.org.uk/profile/health-profiles/data#page/12/qid/1938132974/pat/6/par/E12000008/ati/201/are/E07000064/cid/4/page-options/ovw-do-0_eng-vo-0_eng-do-0_ine-pt-0_ine-vo-1_ine-yo-3:2017:-1:-1_ine-ct-71)

[profiles/data#page/12/qid/1938132974/pat/6/par/E12000008/ati/201/are/E07000064/cid/4/page-options/ovw-do-0_eng-vo-0_eng-do-0_ine-pt-0_ine-vo-1_ine-yo-3:2017:-1:-1_ine-ct-71](https://fingertips.phe.org.uk/profile/health-profiles/data#page/12/qid/1938132974/pat/6/par/E12000008/ati/201/are/E07000064/cid/4/page-options/ovw-do-0_eng-vo-0_eng-do-0_ine-pt-0_ine-vo-1_ine-yo-3:2017:-1:-1_ine-ct-71)>

Figure 15.1 Age profile of Rother's population (2018)



Source: Public Health England

- 15.7.1 Within Rother, the proportion of the population who are female and male is similar for all age groups from 0 to 79. Beyond 80 years of age, the population is majority female⁴⁰.
- 15.7.2 The 2011 Census showed that East Sussex was predominantly white British and Northern Irish (91.7%), exceeding the average for England & Wales (80.5%) (**Table 15.6**). Those from all groups other than White British and Northern Irish comprise 8.3% of the population of East Sussex and are comprised predominantly of 'Other white' groups, with little representation of mixed, Asian or Black communities⁴¹. This data is not available at the District level.

⁴⁰ Age Profile, Resident Population (2018) < https://fingertips.phe.org.uk/profile/health-profiles/data#page/12/qid/1938132974/pat/6/par/E12000008/ati/201/are/E07000064/cid/4/page-options/ovw-do-0_eng-vo-0_eng-do-0_ine-pt-0_ine-vo-1_ine-yo-3:2017:-1:-1_ine-ct-71>

⁴¹ Equality and Diversity Profile for Eastbourne, Hailsham and Seaford Clinical Commissioning Group, East Sussex Public Health Intelligence (2018) <http://www.eastsussexjsna.org.uk/JsnaSiteAspx/media/jsna-media/documents/localbriefings/E%20%26%20D%20profiles/Jan%202018/Equality-Profile-EHS-CCG-Jan-2018.pdf>

Table 15.6: Ethnic Groups, 2011

Ethnic Group	East Sussex (%)	England & Wales (%)
All groups	100	100
White British and Northern Irish	91.7	80.5
All groups other than White British & NI	8.3	19.5
White British and Northern Irish	91.7	80.5
White Irish	0.8	0.9
Gypsy or Irish Traveller	0.2	0.1
Other White	3.4	4.4
White and Black Caribbean	0.4	0.8
White and Black African	0.2	0.3
White and Asian	0.5	0.6
Other Mixed	0.4	0.5
Indian	0.4	2.5
Pakistani	0.1	2.0
Bangladeshi	0.2	0.8
Chinese	0.4	0.7
Other Asian	0.7	1.5
African	0.3	1.8
Caribbean	0.1	1.1
Other Black	0.1	0.5
Arab	0.1	0.4
Any other ethnic group	0.2	0.6

Source: 2011 Census, ONS

- 15.7.3 Rother is not shown to be a particularly deprived nor advantaged area, ranking at 139 of 317 Local Authorities (where the greater the score, the less deprived the area). The extent of deprivation throughout the District is varied, with Lower Super Output Areas (LSOAs: small areas designed to be of similar population size of 1,500 residents or 650 households) identified within each IMD decile from one to nine. This suggests a range in deprivation, with LSOAs falling both within the most deprived 10% of LSOAs nationally (decile 1) to the least deprived 20% of LSOAs nationally (decile 9)⁴².
- 15.7.4 Chapter 14 Socio-economics of the 2014 ES evaluates the LSOAs for Salehurst, as the core impact area for the Proposed Scheme. Salehurst is covered by two LSOAs, coded Rother 001C and Rother 001B. Rother 001C is graded within decile 7 whilst Rother 001B is within decile 5, meaning that Rother 001B is considered to be a more deprived area than Rother 001C.
- 15.7.5 The assessment states that the local economy is very robust and there are very few indications of significant deprivation in the impact area of Salehurst, or indeed, in the immediately surrounding area. Rother district is significantly better than England for the

⁴² English Indices of Deprivation (2019) < www.gov.uk/government/statistics/english-indices-of-deprivation-2019>

average for indicators around deprivation, child poverty, long-term unemployment, violent crime and re-offending⁴³.

Local Health Profile

- 15.7.6 The average life expectancies at birth of females and males in Rother were 84 years and 80.6 years respectively in 2017-19. These values exceed the average life expectancies in England (83.4 in females, 79.8 in males), but are slightly lower than the average life expectancies in the South East region (84.3 in females, 80.8 in males)⁴⁴. In both sexes, the average life expectancy at birth has increased overall since 2001.
- 15.7.7 The life expectancy across Rother has been identified as being affected by deprivation, whereby the least deprived an area, the greater its life expectancy. The absolute gap in life expectancy between the most and least deprived quintiles in Rother was 6.5 years for males and 6.8 years for females in 2017. Circulatory diseases and cancers are the main contributors to the gap in life expectancy between the least and most deprived areas in Rother⁴⁵.
- 15.7.8 The mortality rate considering all causes (in under 75s) is slightly lower than the regional and national averages, with the latest data for the period 2017 to 2019 showing 282 deaths per 100,000 in Rother compared to 288 deaths per 100,000 in the South East and 326 deaths per 100,000 in England. The average mortality rates for the study area, region and nation have exhibited a steady decline between 2001 and 2014, before plateauing to present⁴⁶.
- 15.7.9 Rother has significantly lower mortality from causes considered preventable⁴⁷ compared to the national average. Around half of premature deaths in Rother are due to cancers (48%) and circulatory diseases are the cause of 1 in 5 premature deaths (20%)⁴⁸.

⁴³ Hastings And Rother Clinical Commissioning Group 2016 Needs And Assets Profile (2016) <
http://www.eastsussexjsna.org.uk/JsnaSiteAspx/media/jsna-media/documents/overviews/2016%20LNAP/CCG_H-R_2016.pdf>

⁴⁴ Life expectancy at birth (2021) < https://fingertips.phe.org.uk/profile/health-profiles/data#page/4/gid/1938132701/pat/6/par/E12000008/ati/201/are/E07000064/iid/90366/age/1/sex/1/cid/4/page-options/eng-vo-0_eng-do-0_ovw-do-0_ine-ao-0_ine-pt-0_ine-vo-1_ine-yo-3:2017:-1:-1_ine-ct-71>

⁴⁵ Causes of inequalities in life expectancy, Rother District Needs and assets profile (2017) <
<http://www.eastsussexjsna.org.uk/JsnaSiteAspx/media/jsna-media/documents/overviews/2017%20LNAP/LNP-Rother-District-2017.pdf>>

⁴⁶ Under 75 mortality rate from all causes (2019) < https://fingertips.phe.org.uk/profile/health-profiles/data#page/4/gid/1938132701/pat/6/par/E12000008/ati/201/are/E07000064/iid/90366/age/1/sex/1/cid/4/page-options/eng-vo-0_eng-do-0_ovw-do-0_ine-ao-0_ine-pt-0_ine-vo-1_ine-yo-3:2017:-1:-1_ine-ct-71>

⁴⁷ Hastings And Rother Clinical Commissioning Group 2016 Needs And Assets Profile (2016) <
http://www.eastsussexjsna.org.uk/JsnaSiteAspx/media/jsna-media/documents/overviews/2016%20LNAP/CCG_H-R_2016.pdf>

⁴⁸ Premature mortality – causes of death, Rother District Needs and assets profile (2017) <
<http://www.eastsussexjsna.org.uk/JsnaSiteAspx/media/jsna-media/documents/overviews/2017%20LNAP/LNP-Rother-District-2017.pdf>>

- 15.7.10 The study area reports a significantly higher incidence and prevalence of depression compared to England⁴⁹. Since 2013, the suicide rate⁵⁰ and hospital admissions for intentional self-harm⁵¹ in Rother have persistently been similar to or greater than the regional and national averages.
- 15.7.11 Rother has a significantly higher percentage of its population reporting bad or very bad general health and reporting a limiting long-term illness or disability compared to England⁵². The percentage of adults (aged 18+) classified as overweight or obese, and the proportion of physically active adults, are similar to or greater than the national average. In 2018 to 19, 63.4% of the population of Rother were considered to be overweight or obese, compared to 62.3% of England's population⁵³. During the same period, 65.1% of the population of Rother were considered physically active, compared to 67.2% of England⁵⁴.

Health Provision

- 15.7.12 Rother, and specifically the Application Site, is well provided for in health and care facilities.
- 15.7.13 The closest hospital to the Application Site (considered to run from Northbridge Street to Bodiam) is Hawkhurst Community Hospital. The drive time from the Application Site to this facility is approximately 12 minutes, whilst the walking journey time is 1.5 hours. Public transport options consist of a series of bus services, the journey time for which is 30 minutes.
- 15.7.14 The nearest Accident & Emergency (A&S) Department to the Proposed Scheme is the Conquest Hospital is 9 miles from Robertsbridge, equating to a 15-minute drive.

⁴⁹ Key Findings, Rother District Needs and assets profile (2017) < <http://www.eastsussexjsna.org.uk/JsnaSiteAspx/media/jsna-media/documents/overviews/2017%20LNAP/LNP-Rother-District-2017.pdf>>

⁵⁰ Suicide rate (2019) < https://fingertips.phe.org.uk/profile/health-profiles/data#page/4/gid/1938132701/pat/6/par/E12000008/ati/201/are/E07000064/iid/90366/age/1/sex/1/cid/4/page-options/eng-vo-0_eng-do-0_ovw-do-0_ine-ao-0_ine-pt-0_ine-vo-1_ine-yo-3:2017:-1:-1_ine-ct-71>

⁵¹ Emergency Hospital Admissions for Intentional Self-Harm (2019) < https://fingertips.phe.org.uk/profile/health-profiles/data#page/4/gid/1938132701/pat/6/par/E12000008/ati/201/are/E07000064/iid/90366/age/1/sex/1/cid/4/page-options/eng-vo-0_eng-do-0_ovw-do-0_ine-ao-0_ine-pt-0_ine-vo-1_ine-yo-3:2017:-1:-1_ine-ct-71>

⁵² Key Findings, Rother District Needs and assets profile (2017) < <http://www.eastsussexjsna.org.uk/JsnaSiteAspx/media/jsna-media/documents/overviews/2017%20LNAP/LNP-Rother-District-2017.pdf>>

⁵³ Percentage of adults (aged 18+) classified as overweight or obese (2019) < https://fingertips.phe.org.uk/profile/health-profiles/data#page/4/gid/1938132701/pat/6/par/E12000008/ati/201/are/E07000064/iid/90366/age/1/sex/1/cid/4/page-options/eng-vo-0_eng-do-0_ovw-do-0_ine-ao-0_ine-pt-0_ine-vo-1_ine-yo-3:2017:-1:-1_ine-ct-71>, based on the Active Lives Adult Survey, Sport England.

⁵⁴ Percentage of physically active adults (2019) < https://fingertips.phe.org.uk/profile/health-profiles/data#page/4/gid/1938132701/pat/6/par/E12000008/ati/201/are/E07000064/iid/90366/age/1/sex/1/cid/4/page-options/eng-vo-0_eng-do-0_ovw-do-0_ine-ao-0_ine-pt-0_ine-vo-1_ine-yo-3:2017:-1:-1_ine-ct-71>, based on the Active Lives Adult Survey, Sport England.

- 15.7.15 There are three GP surgeries within a 10-minute driving journey time of the Application Site.

15.8 Identification and description of changes likely to generate effects.

- 15.8.1 The Proposed Scheme has the potential to create environmental changes which in turn may generate effects (positive and negative) to human health. These potential changes are identified below for both the construction and operational phases.

Construction phase

- 15.8.2 The construction of the Proposed Scheme poses the temporary risk of degradation to the local air quality and noise environment due to emissions of dust, pollutants and noise, caused by construction activity, operation of plant and presence of haulage and construction staff vehicles on the local road network, as identified in the Noise & Vibration assessment (Chapter 6) and the Air Quality assessment (Chapter 7) of the 2014 ES and the 2021 ES Update Report.
- 15.8.3 The Traffic and Transport assessment (Chapter 13) of the 2014 ES and the 2021 ES Update Report, finds that the construction activity for the level crossings and introduction of construction vehicles to the local road network may pose a risk to congestion, severance and altered traffic flow; however, these will be mitigated to minor significance through limitation of the construction of the level crossings to weekend and overnight periods to coincide with periods of low traffic volumes therefore mitigating this to a low risk of traffic. Construction management procedures will also ensure the implementation of best practice and safety measures to ensure a negligible risk of collisions to pedestrians and motorists.
- 15.8.4 Chapter 13 of the 2014 ES also estimates that there would be a peak of an additional three HGV movements per day over a short period, based on the current programme. Over the whole construction period, HGV activity is expected to average 2.4 movements per day, therefore is expected to cause a low impact to traffic. Construction will also ensure the implementation of best practice and safety measures to ensure a negligible risk of collisions to pedestrians and motorists.
- 15.8.5 The construction phase of the Proposed Scheme is predicted to have temporary effects on access to and enjoyment of the visual amenity for residents of local properties in Robertsbridge, Northbridge Street and Salehurst.

Operational phase

- 15.8.6 The Proposed Scheme will facilitate the attraction of tourists to the area by train from the Kent & East Sussex Railway (K&ESR). This is likely to result in benefits to the local economy and deprivation through additional local spend.
- 15.8.7 The Proposed Scheme will provide an additional form of access to beneficial open space and visual amenity to its users (such as transport to areas along the route, views from the train whilst in operation etc). The Proposed Scheme lies within the High Weald Area of Outstanding Natural Beauty (AONB) therefore it will provide access to and enjoyment of the flora, fauna and landscape for which it was designated. Chapter 8 of the 2014 ES and the 2021 ES Update Report finds that no significant impacts are expected to the High Weald AONB during construction or operation of the Proposed Scheme.

- 15.8.8 The operation of the Proposed Scheme may also provoke enjoyment in those using and viewing the rail line, through the reinstatement of the historic stretch of railway, therefore exposing people to the local history and heritage and nostalgia of steam engines. Chapter 14 of the 2014 ES found that by reconnecting the RVR to K&ESR, a “*community spirit of optimism usually found with CRPs (community rail projects) may have an opportunity to develop*”. The reinstatement of the rail link will also provide rail access to other heritage and cultural leisure features of the region such as Bodiam Castle and Tenterden Museum.
- 15.8.9 As identified in the Noise & Vibration assessment (Chapter 6) and the Air Quality assessment (Chapter 7) of the 2014 ES and the 2021 ES Update Report, the operation of diesel and steam trains by the Proposed Scheme may lead to minor degradation of the local air quality and noise environment due to emissions of dust, pollutants and engine noise; however, given that the services running on the line will be infrequent and limited (eight journeys per day) and that background noise and air pollution concentrations are low, these effects are expected to be negligible. Hours of operation will also be maintained between 10am to 6pm daily, with a weekly diner service extended to 11pm, to ensure that no operational noise causes nuisance at antisocial hours.
- 15.8.10 As identified within the Major Accidents & Disaster (MAD) risk assessment, the operation of the proposed level crossings poses a negligible risk of collision to train users, pedestrians and vehicle occupants which could cause injury or fatality. The occurrence of this risk is very unlikely due to the implementation of mitigation and safety measures but poses a significant impact should it occur. The Design and Access Statement (DAS) states that the Full Barrier level crossing types chosen to have an excellent safety performance record and are used extensively in other rail projects. Also, heritage railways, such as RVR, operate at maximum speeds of 25 mph, with a reduced speed limit at the level crossings, resulting in short train stopping distances. The type of level crossings proposed by RVR will be locally monitored and controlled by a railway signal person. The original planning consent also dictates that the A21 level crossing be operated outside of morning and evening peak travel times to ensure safe traffic flow.
- 15.8.11 As identified within the MAD risk assessment, there is a negligible risk of explosion associated with the steam engine which could cause injury or fatality to train drivers and passengers. The occurrence of this risk is not significant, due to the implementation of mitigation and safety measures, therefore is not considered further in this assessment.
- 15.8.12 As identified within the MAD risk assessment, there is a negligible risk of derailment during operation of the train, such as during high winds or as a result of embankment collapse or operator error, which could cause injury or fatality to train drivers and passengers. The occurrence of this risk is not significant, due to the implementation of mitigation and safety measures, therefore is not considered further in this assessment.

15.9 Assessment of Likely Significant Effects

15.9.1 **Table 15.7** to **Table 15.12** provide an assessment against a number of questions provided by the HUDU Rapid HIA tool (excluding the health determinant themes identified in **Error! Reference source not found.**Table 15.1. The assessment includes questions relating to the identified key health determinants and covers both construction and operational phases. It should be noted that the 'relevance to health and wellbeing' is to give context as to why a particular assessment question relates to health and is taken from HUDU guidelines.

Table 15.7: Access to open space and nature

Assessment criteria	Relevant to the Proposed Scheme?	Details / evidence	Potential health impact?	Recommended mitigation or enhancement actions
Does the proposal retain and enhance existing open and natural spaces?	Yes	<p>Relevance to health and wellbeing</p> <p>Access to open and green space encourages outdoors physical activity and reduces levels of heart disease, strokes and other ill health problems that are associated with both sedentary occupations and stressful lives. Open and green spaces can also facilitate social interaction, a sense of place and community interaction, which benefits mental and physical health.</p> <p>Evidence</p> <p>The Proposed Scheme runs through an area largely comprised of rural green space and farmland. Access to this land will be enhanced by the operation of the Proposed Scheme, allowing tourists the opportunity to travel along the length of the railway to different areas along the route (majority rural and suburban) and access open and natural spaces in the surrounds.</p> <p>The construction of the Proposed Scheme will require some permanent and temporary landtake (c. 7.2ha), along the former railway corridor. Approximately 5ha of this land will be converted to rail, therefore removing natural spaces, however any temporary land-take areas will be reinstated upon completion to maintain open and natural spaces. Despite the permanent loss of some open space to rail, the 2021 ES Update Report finds that no landscape or visual enhancements are proposed, and no landscape/ visual compensation is considered necessary as it is considered that compensatory</p>	Negligible	<p>Reinstatement of any temporary areas of land take ensuring reinstatement (and where possible, enhancement) of natural space; and</p> <p>Maintenance of natural spaces along the route during operation.</p>

Assessment criteria	Relevant to the Proposed Scheme?	Details / evidence	Potential health impact?	Recommended mitigation or enhancement actions
		habitat planting and the positive effects of the historic value of the restored railway will counter the effects of landtake.		
Does the proposal provide links between open and natural spaces and the public realm?	Yes	<p>Relevance to health and wellbeing Improved connectivity between green spaces and the public realm can encourage active travel and physical activity, with associated benefits for mental and physical health.</p> <p>Evidence The Proposed Scheme runs through an area largely comprised of rural green space and farmland. Access to this land will be enhanced by the operation of the Proposed Scheme, allowing tourists and residents the opportunity to travel from the public realm around the stations, along the length of the railway to different areas along the route (majority rural and suburban) and access open and natural spaces in the surrounds.</p> <p>As described in Chapter 2 Description of the Scheme of the 2014 ES, the Proposed Scheme also provides connection points along the route (five agricultural crossings, a footpath and a combined footpath and bridleway at-grade crossing, two bridge crossings and three level crossings) to ensure open spaces remain linked along the route, preventing segregation of existing natural land along the former rail corridor. These points of interconnection will provide the train passengers with opportunities to access open spaces on either side of the route, as well as the public realm spaces surrounding the rail stations.</p>	Minor positive	Maintenance of natural spaces and connection points along the route during operation per the Landscape and Ecological Management Plan, 2019.
Are the open and natural spaces welcoming and safe and accessible for all?	Yes	<p>Relevance to health and wellbeing Green spaces that are of poor quality, feel unsafe, or are inaccessible will discourage physical activity and social interaction. Planning should also consider varying needs of vulnerable population groups, such as old or disabled people and young parents, and should include the provision of seating opportunities, water fountains, etc. to provide accessible open spaces.</p> <p>Evidence</p>	Moderate positive	Maintenance of natural spaces and connection points along the route during operation per the Landscape and Ecological Management Plan, 2019.

Assessment criteria	Relevant to the Proposed Scheme?	Details / evidence	Potential health impact?	Recommended mitigation or enhancement actions
		<p>As stated in Chapter 9 of the 2014 ES, the quality of natural space surrounding the Proposed Scheme will be a minor negative impact due to land take and habitat clearance for construction. The natural land will be reinstated and maintained by the provisions of habitat planting and creation of new habitat spaces on land nearby.</p> <p>Along the route, several at-grade pedestrian crossings will be implemented to ensure step-free accessibility is maintained for all. These features are designed in accordance with best practice and safety measures to ensure safe and secure access to the public, natural spaces.</p> <p>The operation of the Proposed Scheme will also facilitate safe, contained travel along the route to the different public realm spaces near to stations. Station access and security will be maintained to provide safe access. The majority of the line's services also include a specially designed coach called Petros, which is fitted with ramped wheelchair access, wide aisles, moveable seating and an accessible toilet. Some of the other carriages have ramped access too and there is full wheelchair access to the Shop and Colonel Stephens Railway Museum at Tenterden Town Station.</p> <p>The Proposed Scheme does not provide additional public realm space, therefore the provision of seating opportunities, water fountains etc are negligible.</p>		
Does the proposal set out how new open space will be managed and maintained?	Yes	<p>Relevance to health and wellbeing</p> <p>There is a strong correlation between the quality of open space and the frequency of use for physical activity, social interaction or relaxation. Management and maintenance are needed to ensure the long-term viability and uptake of open space.</p> <p>Evidence</p> <p>As stated in Chapter 9 of the 2014 ES, the quality of natural space surrounding the Proposed Scheme will be maintained by the provisions of habitat planting and creation of new habitat spaces on land nearby. Monitoring and maintenance of areas of habitat creation would be undertaken for a period of five years.</p>	Minor positive	<p>Monitoring and maintenance of access infrastructure along the route, to ensure open and natural space is available for all; and</p> <p>Monitoring and maintenance of areas of habitat</p>

Assessment criteria	Relevant to the Proposed Scheme?	Details / evidence	Potential health impact?	Recommended mitigation or enhancement actions
				creation for a period of five years.
Assessment		<p>The Proposed Scheme facilitates the reinstatement of a length of former rail track between Robertsbridge and Bodiam. The proposals include for the maintenance of natural space along the track, and the installation of several at-grade crossing points to ensure movement across the line is maintained along the route for people of all abilities. Access and trackside space will be monitored and maintained, but no material proposals are in place for the enhancement of these spaces. The proposals will facilitate access between the RVR and K&ESR therefore enabling access by users to different areas of public realm, open space and visual amenity within the Rother district.</p> <p>The effects to health are considered positive, particularly for those that currently do not have access to open space (such as those living in the District's more deprived areas) and for those with disabilities that require step-free access options. Proposals in regard to the maintenance and enhancement of open and natural space are considered to be minor positive whereby the receptors are considered to be of low sensitivity (such as transient tourists) and the magnitude of changes expected to be minor; this combines to produce a minor positive health effect, which is not significant.</p> <p>The effects to those considered of medium sensitivity (such as those living in the local area or using the PRow's) or high sensitivity (those living in more deprived areas and vulnerable people (e.g. those with a disability)) are considered to be of a moderate positive impact, and therefore significant, whereby they provide enhanced access to natural and open spaces through accessible design and the operational act of transporting users to natural landscapes for recreation and leisure outside of more deprived areas.</p>		

Table 15.8: Air quality, noise and neighbourhood amenity

Assessment criteria	Relevant to the Proposed Scheme?	Details / evidence	Potential health impact?	Recommended mitigation or enhancement actions
Does the proposal minimise construction impacts such as dust, noise, vibration and odours?	Yes	<p>Relevance to health and wellbeing Human health is affected by both poor air quality and noise pollution. Prolonged exposure to excessive noise can cause various short- and long-term health problems, such as cardiovascular and physiological effects, mental health effects, hearing impairment, reduced performance and provocation of annoyance responses and changes in social behaviour.</p> <p>Evidence Chapter 7 found that effects to air quality, and subsequently health, could occur during construction from road vehicle and equipment emissions, and the generation of dust from construction of new embankments, stockpiling of soils and excavations for the foundations of new structures (such as the crossing structures). Following implementation of best practice and mitigation measures as outlined in the CEMP (a condition of the planning consent) the construction and operation of the Proposed Scheme is not expected to result in any significant noise and vibration effects to receptors and is therefore not expected to result in any significant negative effects to health.</p>	Minor negative	As specified in the CEMP
Does the proposal minimise air pollution caused by traffic and energy facilities?	Yes	<p>Relevance to health and wellbeing Human health is affected by both poor air quality and noise pollution. Air pollution is associated with several adverse health impacts and is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society such as children and older people, and those with heart and lung conditions.</p> <p>Evidence Road traffic is the dominant source of air pollution in the area. The main pollutants of concern with respect to road traffic are nitrogen dioxide (NO₂) and particulate matter (PM₁₀ and PM_{2.5}).</p>	Minor negative	As specified in Chapter 6 of the 2014 ES

Assessment criteria	Relevant to the Proposed Scheme?	Details / evidence	Potential health impact?	Recommended mitigation or enhancement actions
		<p>Chapter 7 of the 2014 ES and the 2021 ES Update Report identify that, during operation, emissions from steam and diesel engines using the proposed track reinstatement have been assessed as being negligible - a maximum of only eight return train journeys are forecast per day which, due to existing low pollutant background concentrations in the area, is not expected to give rise to a significant effect on air pollution and subsequently health.</p> <p>Chapter 7 of the 2014 ES and the 2021 ES Update Report also finds no significant impact (positive or negative) to the environment or human health as a result of operational traffic on the local road network (inclusive of the level crossing proposals). The assessment considers queuing vehicles on the A21 will have a negligible impact on annual mean pollutant concentrations at the nearest sensitive receptors.</p>		
Does the proposal minimise noise pollution caused by traffic and commercial uses?	Yes	<p>Relevance to health and wellbeing</p> <p>Prolonged exposure to excessive noise can cause various short- and long-term health problems, such as cardiovascular and physiological effects, mental health effects, hearing impairment, reduced performance and provoke annoyance responses and changes in social behaviour. Some groups, such as children, older people, shift workers and people with caring responsibilities, who spend more time at home are more vulnerable to noise. In addition, people on lower incomes, who cannot afford to live in quiet residential areas or have inadequately insulated homes, are likely to suffer disproportionately.</p> <p>Evidence</p> <p>Chapter 6 of the 2014 ES and the 2021 ES Update Report finds no significant impact (positive or negative) to the environment or human health as a result of operational traffic on the local road network (inclusive of the level crossing proposals) or from operational steam and diesel engines on the rail network.</p> <p>Rail traffic is not expected to cause noise nuisance to receptors. The timetabled service will operate between 10am and 6pm daily, with a weekly</p>	Minor negative	Ensure operation of the level crossing alarm is kept to the minimum acceptable length to avoid nuisance whilst ensuring safety.

Assessment criteria	Relevant to the Proposed Scheme?	Details / evidence	Potential health impact?	Recommended mitigation or enhancement actions
		<p>diner service proposed to end at 11pm; therefore, the service will not cause effects to sleep or comfort during antisocial hours.</p> <p>The introduction of the level crossing has been identified as likely to contribute towards a reduction in noise pollution from road traffic as slower moving traffic generates lower noise levels than the existing faster traffic moving uninhibited; however, noise from stopped traffic would be of a different character (i.e., engine idling noise and acceleration rather than tyre noise from free-flowing traffic).</p> <p>The assessment finds that there is also a low potential for annoyance from the operation of the level crossing alarms. The alarm would be sounded at a low level, loud enough to be heard by crossing pedestrians but not at a level so as to distract motorists. The sound has potential to be heard by receptors close to the alarm, however this would be only for the short duration and unlikely to be obtrusive.</p>		
Assessment		<p>Air quality and noise & vibration assessments have concluded that there is no significant impact to the environment, and therefore to human health, as a result of the construction and operation of the Proposed Scheme.</p> <p>During construction, minor negative impacts could be expected as a result of fugitive dust generation and emission of pollutants from the operation of construction plant and traffic. These effects will be managed through the implementation of the CEMP, outlining the best practice mitigation measures to be used.</p> <p>During operation, minor negative impacts to air quality and noise could be expected as a result of the operation of the level crossings (resulting in idling traffic and operation of the pedestrian crossing alarm) and the movement of operational trains past receptors. However, these effects are not expected to be significant due to their short operational period, operation within social hours only, and the distance from receptors over which the noise and pollutant emissions are expected to attenuate.</p> <p>Overall, the impact magnitude was assessed as low and sensitivity of receptor as medium, leading to a minor negative impact in construction and operation. These impacts are not considered significant.</p>		

Table 15.9: Accessibility and active travel

Assessment criteria	Relevant to the Proposed Scheme?	Details / evidence	Potential health impact?	Recommended mitigation or enhancement actions
Does the proposal connect public realm and internal routes to local and strategic cycle and walking networks?	Yes	<p>Relevance to health and wellbeing Improved connectivity between green spaces and the public realm can encourage active travel and physical activity, with associated benefits for mental and physical health.</p> <p>Evidence The Proposed Scheme will reinstate the rail line connection between Robertsbridge and Bodiam, therefore providing direct access to the public realm spaces and natural spaces along the RVR and K&ESR route. As identified in Chapter 2 of the 2014 ES and the 2021 ES Update Report, links from the rail track to the wider active transport networks are facilitated by considerations such as the three-highway level-crossings and one providing a bridleway crossing which will enable connections between the public realm and open space. During construction, PRoWs will remain open throughout the construction phase with appropriate fencing and signage installed to ensure the health and safety of users. The bridleway crossing will be subject to two one day closure to enable the installation of the level-crossing. Barrier fencing and gates would be installed to ensure safe use and appropriate surface for walking installed. During operation, it is possible that PRoW passage will be interrupted by closure of the level crossings for train operations; however, due to the infrequency and low duration of these interruptions they not expected to cause significant negative impact. The crossings are expected to be beneficial to less mobile and physically able users, as they would remain at-grade level to ensure step-free access to all non-motorised users such as those with bikes, buggies and wheelchairs.</p>	Minor positive	Maintenance of the safety and operation of access points along the route to encourage use by pedestrians, cyclists and horse riders.
Does the proposal include traffic management	Yes	<p>Relevance to health and wellbeing Greater traffic volumes and speeds have increased the risk of road traffic injuries, with pedestrians and cyclists being particularly vulnerable.</p>	Minor positive	Maintenance of level crossings and implementation of best practice safety

Assessment criteria	Relevant to the Proposed Scheme?	Details / evidence	Potential health impact?	Recommended mitigation or enhancement actions
and calming measures to help reduce and minimise road injuries?		Evidence The design of the Proposed Scheme includes the installation of three at-grade full carriageway level-crossings on Northbridge Street, the A21, and the B2244 Junction Road to manage the flow of vehicular and pedestrian traffic across the reinstated rail track.		and operational measures to reduce risk of collisions; and Encouragement of uptake of active transport modes to travel to the route's stations.
Is the proposal well connected to public transport, local services and facilities?	Yes	Relevance to health and wellbeing Supporting a shift away from private car use and towards public transport will not only contribute to decreasing air and noise pollution. Combining active travel and public transport options can also help people achieve recommended daily physical activity levels. Evidence In operation, the Proposed Scheme will provide an additional access route to the K&ESR, currently only accessible by road. Improved access to the route will promote enjoyment of the surrounding areas and amenities via train travel (and further exploration via foot/ bike) rather than via individual cars; however, this will be minimal whereby 1% of trips to K&ESR and 1% of trips to Bodiam castle to shift from road to rail (Rother Valley Railway Economic Impact Report, Steer, 2018). The Proposed Scheme also provides footpaths, pedestrian/ bridleway crossings and bridge crossings to prevent segregation of the areas either side of the track. In operation, access to facilities and services in proximity of the stations and associated public realm should be promoted to rail users to encourage use of local amenities.	Minor positive	Encouragement of uptake of active transport modes to travel to the route's stations. Encouragement of exploration from the rail route via foot and/ or bike; and Promotion of local services and facilities to rail users.
Does the proposal allow people with	Yes	Relevance to health and wellbeing	Moderate positive	Ensure design proposals incorporate access

Assessment criteria	Relevant to the Proposed Scheme?	Details / evidence	Potential health impact?	Recommended mitigation or enhancement actions
mobility problems or a disability to access buildings and places?		<p>Increased accessibility is particularly important for those with mobility problems, including older people, people with a disability and people without access to a car or unable to afford public transport.</p> <p>Evidence</p> <p>The Proposed Scheme provides an additional access route to the K&ESR and surrounds, currently only accessible by road.</p> <p>The operation of the Proposed Scheme will also facilitate safe, contained travel along the route to the different public realm spaces near to stations. Station access and security will be maintained to provide safe access.</p> <p>The majority of the line's services will also include a specially designed coach called Petros, which is fitted with ramped wheelchair access, wide aisles, moveable seating and an accessible toilet. Some of the other carriages will have ramped access too. As existing, there will be full wheelchair access to the Shop and Colonel Stephens Railway Museum at Tenterden Town Station.</p>		<p>features to enable those with mobility problems or a disability to travel; and</p> <p>Incorporate design features to enhance the travel experience of those with a disability such as conductor/help services, easy to read help information and accessible wheelchair docks, aisles and bathrooms where not included on services already.</p>
Assessment		<p>The available scheme information demonstrates that the introduction of the Proposed Scheme seeks to introduce an alternate access route to the K&ESR, currently only accessible by road, to facilitate access to open, natural and public realm spaces surrounding the Proposed Scheme for a wider audience and via alternate transport measures. However, this shift will be minimal whereby 1% of trips to K&ESR and 1% of trips to Bodiam Castle are expected to shift from road to rail. The impact magnitude was therefore assessed as low, leading to a minor positive effect on health and wellbeing which is not significant.</p> <p>The Proposed Scheme also advocates for those less mobile, or with a disability, in its design by providing secure, step-free access at its crossings and specialised coaches in its daily services. Those receptors who are less able would be considered of medium to high sensitivity due to a lower threshold for absorbing change. The magnitude of the effect in this case is considered medium, therefore the effects to health for disabilities are considered to be of a moderate positive impact, and therefore significant, whereby they provide enhanced access to natural and open spaces through accessible design and the operational act of transporting users to natural landscapes for recreation and leisure outside of more deprived areas.</p>		

Table 15.10: Social cohesion and inclusive design

Assessment criteria	Relevant to the Proposed Scheme?	Details / evidence	Potential health impact?	Recommended mitigation or enhancement actions
Does the proposal consider health inequalities by addressing local needs through community engagement?	Yes	<p>Relevance to health and wellbeing The engagement of local communities in planning and managing facilities and spaces is not only crucial to ensure buy-in for projects and to foster a sense of place. It is also necessary in order to determine which measures are (most) needed and to tailor their design to the local population's needs, ensuring the best outcome in terms of health and wellbeing. By specifically targeting fewer vocal segments of the population, such as young, socio-economically deprived, old and disabled people, community engagement can play a crucial part in addressing and reducing health inequalities⁵⁵.</p> <p>Evidence As stated in Chapter 5 of the 2014 ES, RVR has engaged in a programme of consultation with a range of key stakeholders. This has included one-to-one meetings with individuals, presentations to a wide range of groups, including the District Council, the three parish councils and holding events at the Robertsbridge Station site to raise awareness and answer questions from the general public. The consultation process was used to determine ways to mitigate potential health impacts for local receptors. For example, following discussions with the Council, it was agreed that a qualitative assessment of fugitive dust emissions for the construction period would be undertaken, in addition to mitigation proposals to minimise any potential nuisance effects of fugitive dust emissions.</p>	Negligible	As proposed in the ES, the Applicant should consider engaging in consultation activity to accompany the construction process. For instance, RVR could engage with local receptors to provide prior warning about potential noise and vibration nuisance during construction activity, to make this more amenable to potentially affected population groups.
Does the proposal provide opportunities	Yes	<p>Relevance to health and wellbeing The most powerful sources of stress include low social status and a lack of social networks. Low levels of social integration and loneliness have been shown to significantly increase mortality. Social networks and social</p>	Minor positive	Car sharing will be encouraged between site operatives where practicable to

⁵⁵ Barton, H. et al. (2003) Shaping neighbourhoods. A guide for health, sustainability and vitality. London: Spon Press.

Assessment criteria	Relevant to the Proposed Scheme?	Details / evidence	Potential health impact?	Recommended mitigation or enhancement actions
for the voluntary and community sectors?		<p>participation appear to act as a protective factor against dementia or cognitive decline over the age of 65 and social networks are consistently and positively associated with reduced morbidity and mortality⁵⁶. Planning can provide opportunities for social interaction, by providing an enabling environment for voluntary or community organisations. This may contribute to improving social interaction and cohesion and reducing loneliness and related health and wellbeing effects.</p> <p>Evidence</p> <p>As stated in Chapter 14 of the 2014 ES, many of the construction workers will be volunteers that live locally within walking or cycling distance of the Site. It is proposed that external contractors residing elsewhere are to be brought in for specialist tasks only, and that the majority of works are to be conducted by volunteers.</p>		minimise impacts to congestion on the local road network.
Assessment	<p>A range of engagement activities have been undertaken by the Applicant to agree with stakeholders and the local community appropriate ways to mitigate negative health impacts, including with regards to noise, vibration and air pollution. The proposal also provides opportunities for volunteer work during the construction phase for the local community. For the proposal, the impact magnitude was assessed as low and the sensitivity of receptors assessed as medium therefore leading to an expected minor positive effect on health and wellbeing in terms of social cohesion and inclusive design.</p>			

⁵⁶ Marmot, M. et al. (2010) Fair Society, Healthy Lives. The Marmot Review.

Table 15.11: Minimising the use of resources.

Assessment criteria	Relevant to the Proposed Scheme?	Details / evidence	Potential health impact?	Recommended mitigation or enhancement actions
Does the proposal make best use of existing land?	Yes	<p>Relevance to health and wellbeing Land use has a direct impact on public health and effective land use can contribute to limiting environmental risk factors for health and facilitating active lifestyles⁵⁷. Redevelopment on brownfield sites or derelict land also ensures that land is effectively used, recycled, and enhanced.</p> <p>Evidence As stated in the 2021 ES Update Report, the Proposed Scheme will require approximately 7.2 ha of permanent land take. Of this, approximately 3.4 ha (54% of the total area required) consists of former railway corridor, which has remained largely intact since the line was decommissioned; development on this land makes use of brownfield space. The proposal aims to reinstate a 3.4km section of the former railway line, which is deemed an effective use of existing land compared to using previously undeveloped land.</p>	Minor positive	<p>Reinstatement of temporary landtake following construction; and</p> <p>Maintenance of reclaimed land to ensure (and enhance where possible) ongoing access to natural space.</p>
Does the proposal encourage recycling, including building materials?	Yes	<p>Relevance to health and wellbeing Reducing or minimising waste including disposal, processes for construction and encouraging recycling at all levels can improve human health directly and indirectly by minimising environmental impact, such as air pollution.</p> <p>Evidence Chapter 13 of the 2021 ES Update Report, Climate Change Mitigation and Adaptation has identified potential negative effects in terms of embodied carbon in building materials across the project lifespan and end of life carbon costs. This will be addressed through the implementation of best practice measures to reduce the embodied carbon</p>	Minor negative	As specified

⁵⁷ Jackson, R. et al. (2002) Land use planning: Why public health must be involved. The Journal of Law, Medicine & Ethics, 30(3).

Assessment criteria	Relevant to the Proposed Scheme?	Details / evidence	Potential health impact?	Recommended mitigation or enhancement actions
		of building materials, including the recycling of material, and encourage a circular economy approach to the selection of building materials.		
Does the proposal incorporate sustainable design and construction techniques?	Yes	<p>Relevance to health and wellbeing Reducing or minimising waste including disposal, processes for construction and encouraging recycling at all levels can improve human health directly and indirectly by minimising environmental impact, such as air pollution.</p> <p>Evidence Chapter 13 of the 2021 ES Update Report, Climate Change Mitigation and Adaptation has identified potential negative effects during construction (relating to building materials and construction traffic) and operation of the Proposed Scheme (relating to operational traffic emissions and waste management). These will be addressed through the implementation of best practice measures as outlined in the CEMP to ensure the incorporation of sustainability into construction planning and execution.</p>	Minor negative	As specified
Assessment	<p>The Proposed Scheme ensures effective use of available land by incorporating the former railway line and the development of formerly undeveloped parcels of land into its design. Whilst the Proposed Scheme will convert some land permanently to rail, the land that is not permanently required will be released and reinstated to its former state.</p> <p>Several negative sustainability effects were identified in the climate change assessment, in particular with regards to emissions associated with construction and operational traffic, and the selection of building materials. These will be mitigated through the implementation of the CEMP and best practice and monitored during operation. The magnitude of change is assessed as being low, whilst the sensitivity of receptor is assessed as being medium. Overall, the effect of the proposal in terms of resource use is deemed minor negative, therefore not significant.</p>			

Table 15.12: Climate change

Assessment criteria	Relevant to the Proposed Scheme?	Details / evidence	Potential health impact?	Recommended mitigation or enhancement actions
Does the proposal maintain or enhance biodiversity?	Yes	<p>Relevance to health and wellbeing Biodiversity describes the variety of species of wild plants, animals, fungi and other organisms present in a specific place or location. Through ecosystem services, biodiversity plays an important role for human health and wellbeing.</p> <p>Evidence Chapter 9 of the 2014 ES identifies the displacement of/disturbance to bats and birds within the construction corridor and the loss of limited numbers of mature trees due to habitat clearance to enable construction. Inline with the original planning consent, whereby biodiversity must be maintained, it is proposed to conduct habitat planting following construction to mitigate these losses; however, this would take time to establish which would result in a negative effect upon dormice during this period, therefore measures to protect biodiversity will be taken during construction inline with the CEMP.</p> <p>The main impacts of the Scheme are associated with the construction phase. Once operational, no significant additional impacts are considered likely to occur. The mitigation proposed for the construction phase is considered sufficient to minimise the risk of impacts once the railway is operational such that these are not considered a significant effect.</p> <p>The original planning consent also requires the production of a Landscape and Ecological Management Plan, which was produced in 2019. This contains details of the planting extent and type, and the management and maintenance regimes. Implementation of this plan will act to reduce negative impacts.</p>	Minor negative	5-year monitoring plan for the re-provisions of woodland, planting of scrubs and hedgerows.
Does the proposal incorporate sustainable	Yes	<p>Relevance to health and wellbeing Building in flood plain areas and/ or a lack of local sustainable urban drainage methods increases flood risk. Flooding can have obvious physical health and safety hazards, such as from drowning and contamination of water supplies and can also affect property prices and</p>	Minor negative	As specified in CEMP

Assessment criteria	Relevant to the Proposed Scheme?	Details / evidence	Potential health impact?	Recommended mitigation or enhancement actions
urban drainage techniques?		<p>insurance costs. The fear of flooding can also cause significant levels of anxiety and mental health issues, particularly in more vulnerable groups.</p> <p>Evidence</p> <p>The 2021 ES Update Report indicates that the Proposed Scheme will not result in an increase in fluvial flood risk and that it will be at risk of flooding during a 1 in 20-year flood event in the area upstream of Udiam. During construction, implementation of the CEMP will ensure that this risk is managed whereby protective precautions will be implemented to ensure that construction works can continue in flood waters without obstruction. The CEMP will also ensure that runoff from activities would be separated into 'contaminated' water (sewage and/or trade effluent) which would receive appropriate treatment before discharge to a suitable water body, and 'uncontaminated' water (drainage from roof or clean yard areas) which can be discharged directly to a water body.</p> <p>As outlined in the FRA, rail services during operation will be restricted in times of risk of severe flood to ensure passenger and operator safety.</p> <p>It is also found that the post-scheme plus mitigation scenario will not increase surface water flood risk to other areas.</p>		
Assessment	<p>The proposal may negatively affect biodiversity, particularly in terms of habitat loss, but will not increase flood risk in the study area. Following implementation of the proposed mitigation measures the magnitude of change is assessed as being low, whilst the sensitivity of receptor is assessed as being medium. Overall, the effect of the proposal in terms of resource use is deemed minor negative, therefore not significant.</p>			

15.10 Cumulative Effects

- 15.10.1 Cumulative effects are the combined effects of several development schemes (in conjunction with the Proposed Scheme) which may, on an individual basis be insignificant but, cumulatively, have a significant effect.
- 15.10.2 The ES has given consideration to 'Cumulative 'Effects' for schemes located within proximity of the Proposed Scheme. A review of all planning consents granted has been undertaken and no development has been identified that would affect or could be affected by the Proposed Scheme or be likely to act in combination to produce a significant impact to human health.

15.11 Summary and Conclusions

- 15.11.1 This chapter has considered a number of health determinant criteria to establish the overall effects of the Proposed Scheme on local health and wellbeing. These are summarised as follows in **Table 15.13**.

Table 15.1 Summary of human health effects

HUDU item	Sensitivity of receptor	Project activity	Impact magnitude	Typical significance of health effect
Access to open space and nature	Low	Reinstatement of former rail track and installation of access points to surrounding open and natural space	Low	Minor positive, not significant
	Medium	Accessible design and provision of transport to natural spaces for recreation and leisure	Medium	Moderate positive, significant
Air quality, noise and neighbourhood amenity	Medium	Generation of dust, pollutant and noise emissions from construction and operational activity	Low	Minor negative, not significant
	Medium	Level crossing operation resulting in idling traffic and crossing alarm	Low	Minor negative, not significant
Accessibility and active travel	Low	Provision of alternate access route to the Kent & East Sussex Railway and surrounds from road	Low	Minor positive, not significant
	High	Provision of accessible and specialised facilities to ensure accessibility to users of all abilities.	Medium	Moderate positive, significant impact
Social cohesion, inclusive design and engagement opportunities	Low	Incorporation of local stakeholders needs through engagement; and provision of alternate access route to the Kent & East Sussex Railway and surrounds from road. Provision of volunteer opportunities during construction.	Low	Minor positive, not significant
Resource use	Medium	Effective use of land and building materials. Potential emissions from construction and operational activity.	Low	Minor negative, not significant

HUDU item	Sensitivity of receptor	Project activity	Impact magnitude	Typical significance of health effect
Climate change	Medium	Changes to biodiversity due to reduction in habitat provision for bat and bird species.	Low	Minor negative, not significant

- 15.11.2 Overall, the Proposed Scheme is expected to have a mixed but minor positive (not significant) impact to human health through the provision of an access route to the Kent & East Sussex Railway, currently only accessible by road. This will facilitate travel to and between areas of public realm and surrounding natural spaces along the route to users. This will particularly benefit accessibility for tourists to the area, therefore improving the local economy through additional spending and employment. This will also lead to positive health outcomes for those who are more sensitive such as the elderly or disabled or those living in deprived areas, whereby they will more readily be able to access natural and cultural amenities, often outside of the area in which they live.
- 15.11.3 A moderate positive (significant) impact is expected as a result of provisions for those less mobile or with a disability, whereby all track crossings are implemented at-grade, and specialised coaches provided for on the majority of services for disabled access.
- 15.11.4 Negative impacts to the environment which may pose risk to human health, such as the degradation of the air quality and noise environment, are considered to be minor negative or negligible (not significant) following mitigation. During construction, negative impacts to human health such as the effects of dust, pollutant and noise emissions from construction activity and plant will be mitigated through the implementation of the CEMP and best practice measures. In operation, these effects are expected to be negligible given that the services running on the line will be infrequent and limited and that background noise and air pollution concentrations are low. Hours of operation will also be maintained between 10am to 6pm daily, with a weekly diner service extended to 11pm, to ensure that no operational noise causes nuisance at antisocial hours.
- 15.11.5 A minor negative effect (not significant) will be caused by the availability of open land and biodiversity during construction; however, this will be mitigated through the provision of habitat planting to remediate land temporarily used for construction, in line with the LEMP.

16.0 Major Accident Hazards and Disasters

16.1 Specialist experience

- 16.1.1 Stephen Price is an Associate Director at Temple Group. Stephen has with 17 years' experience in planning and environmental assessment. Stephen holds an MA in Environmental Impact Assessment and Management, a Diploma in Town and Regional Planning and a BA (Hons) in Urban Studies and Planning. He is a Full Member of the Royal Town Planning Institute (MRTPI) and a Practitioner Member of the Institute of Environmental Management and Assessment (IEMA). Stephen has undertaken environmental assessments and co-ordinated large-scale infrastructure EIAs across a range of sectors including rail, energy, property, waste and minerals.

16.2 Introduction

- 16.2.1 The Environmental Impact Assessment (Miscellaneous Amendments Relating to Harbours, Highways and Transport) Regulations 2017⁵⁸ introduced a new requirement for the project proponent to provide, where relevant:

"A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned.....Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies".

- 16.2.2 A recent Institute of Environmental Management and Assessment (IEMA) document⁵⁹ defined a major accident as an event such as a train derailment or major road traffic accident that threatens immediate or delayed serious environmental effects to human health, welfare and/or the environment, and which can be caused by disasters resulting from both man-made and natural hazards. A disaster is identified as a man-made hazard such as an act of terrorism, or a natural hazard with the potential to cause an event or situation that meets the definition of a major accident. For the remainder of this chapter the term 'major event' has been used to cover natural and man-made hazards that have the potential to cause both accidents and disasters.
- 16.2.3 The purpose of this chapter is to assess the vulnerability of the Proposed Scheme to those hazards that have the potential to cause a major event and which could then generate a significant adverse effect on the environment. This has been defined as those factors that are normally considered in the EIA process: population, human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage, including architectural and archaeological aspects, and landscape.

⁵⁸ *The Environmental Impact Assessment (Miscellaneous Amendments Relating to Harbours, Highways and Transport) Regulations 2017*, Statutory Instrument No. 1070. London, Her Majesty's Stationary Office

⁵⁹ Institute of Environmental Management and Assessment (2020), *Major Accidents and Disasters in EIA: A Primer*.

- 16.2.4 The assessment consists of two stages, with the first a high-level scoping exercise to sift out those hazards that the Proposed Scheme is not vulnerable to or where it is extremely unlikely that the hazard would occur during the construction phase or once it is operational. This has been assumed as 120 years, which is an accepted standard time period for railway infrastructure to be operational. The second stage involves a detailed assessment of those hazards identified at stage 1 where there is a realistic possibility that they could result in a major event and have a subsequent significant adverse effect on the environment. In response to those mitigation measures that will be put in place to reduce the risk of a major event occurring, the assessment will conclude with consideration of whether there is any possibility that the vulnerability of the Proposed Scheme to a major event could result in a significant adverse residual effect on the environment.

16.3 Scope and methodology

- 16.3.1 In the context of the short time that has elapsed since the 2017 EIA Regulations came into force, there is currently no recognised standard methodology for assessing significant environmental effects associated with the vulnerability of a development to a major event. However, as identified in section 16.2 useful guidance has recently been published by IEMA and reference can also be made to previous assessments that have been undertaken for similar projects.
- 16.3.2 It is generally accepted by practitioners that this topic was introduced into the 2017 EIA Regulations to focus on those major events which have a low likelihood of occurring but if they did, could result in serious consequences on the environment. Therefore, as part of stage 1 a detailed study was undertaken to identify those natural and man-made hazards that the Proposed Scheme is vulnerable to and which have a realistic chance of happening due to the location and characteristics of the project. This exercise utilised the baseline information presented in the 2014 ES and this 2021 EA Update Report and a number of desktop sources, including:
- Google Earth https://www.google.co.uk/intl/en_uk/earth/;
 - Climate conditions <https://weather-and-climate.com/average-monthly-Rainfall-Temperature-Sunshine,robertsbridge-east-sussex-gb,United-Kingdom>;
 - UK Seismic hazard map https://earthquakes.bgs.ac.uk/hazard/uk_hazard_map.html;
 - UK subsidence hotspots <https://www.geobear.co.uk/wp-content/uploads/sites/4/2017/11/uk-subsidence-map-2017-south-1.pdf>;
 - Utility information <https://www.nationalgrid.com/uk/electricity-transmission/network-and-infrastructure/network-route-maps>;
 - Mining activity <https://mapapps2.bgs.ac.uk/coalauthority/home.html>;
 - Control of Major Accidents Hazards (COMAH) sites <https://notifications.hse.gov.uk/COMAH2015/Search.aspx>;
 - Unexploded ordnance <https://zeticauxo.com/downloads-and-resources/risk-maps/>;
and

- Europe tsunami hazard map:
<https://www.preventionweb.net/english/professional/maps/v.php?id=3831>.

16.3.3 The matrix in **Table 16.1** has been used to identify those hazards that required further assessment. It considers the vulnerability (high, medium or low) of the Proposed Scheme to the hazard against the likelihood of it occurring, which has been defined as extremely likely, likely, unlikely or extremely unlikely.

Table 16.1: Scoping matrix

Likelihood			
Extremely likely	Yes	Yes	Yes
Likely	Yes	Yes	Yes
Unlikely	Yes	No	No
Extremely unlikely	No	No	No
	High	Medium	Low
	Vulnerability		

16.3.4 The results of the stage 1 assessment are presented in Appendix H and conclude that the Proposed Scheme is vulnerable to the following hazards which have a realistic chance of happening over the lifetime of the project:

- Persistent flooding which leads to a landslip/collapse of an embankment resulting in a potential derailment and/or the degradation of sensitive ecological receptors due to siltation of the River Rother and surrounding watercourses;
- High winds leading to a potential derailment as a result of trees and debris being blown onto the route of the Proposed Scheme;
- Loss of life and injury at a level crossing due to a collision between a train and a vehicle(s); and
- Loss of life or injury to train operators and passengers as a result of an explosion in the steam engine, which could lead to a catastrophic fire.

16.3.5 Stage 2 involves a detailed assessment of those hazards identified at Stage 1 that have a realistic chance of resulting in a major event and which could subsequently result in a significant adverse environmental effect. As part of the judgment on whether an identified effect is significant consideration has been given to the magnitude of the predicted impact and the sensitivity of the affected receptor. With respect to impact magnitude, the following factors have been taken into account:

- Extent: the area over which an effect occurs;
- Duration: the time for which the effect occurs;
- Frequency: how often the effect occurs; and
- Severity: the degree of change relative to existing environmental conditions.

16.3.6 Based on the above criteria impact magnitude has been defined as high, medium or low.

16.3.7 Those factors that influence the sensitivity of the receptor include:

- Adaptability: the degree to which a receptor can avoid, adapt to or recover from an effect;
- Tolerance: the ability of a receptor to accommodate temporary or permanent change; and
- Recoverability: the extent to which a receptor will recover following an effect.

16.3.8 In response to the above criteria receptor sensitivity has been defined as high, medium or low.

16.3.9 **Table 16.2** demonstrates how the magnitude of the impact and the sensitivity of the receptor combines to define whether the predicted effect is significant. For the purposes of this assessment any effect that is moderate or major is classified as significant.

Table 16.2: Effect significance

Receptor sensitivity	Impact Magnitude		
	Low	Medium	High
Low	Negligible	Minor	Moderate
Medium	Minor	Moderate	Major
High	Moderate	Major	Major

16.4 Baseline

Flood Risk

16.4.1 The Environment Agency's Flood Map⁶⁰ for planning shows that the site of the Proposed Scheme is within Flood Zone 3, which is described within the Planning Practice Guidance⁶¹ Table 1: Flood Risk as having a 'high probability' of flooding. Flood Zone 3 comprises land assessed as having a 1 in 100 or greater annual probability of river flooding, or a 1 in 200 or greater annual probability of sea flooding from the sea.

16.4.2 The design of the railway includes sections where the track elevation will be set close to existing ground levels and therefore at risk of flooding. The Flood Risk Assessment addendum (see Appendix G) concludes that sections of the railway between Salehurst and Robertsbridge Abbey are predicted to experience flood depths of 300mm along most of this section, with a small section of railway predicted to flood up to 600mm in the 5% Annual Exceedance Probability (AEP) design flood event. In the extreme 0.1% AEP design flood event the railway between Salehurst and Robertsbridge Abbey, and immediately upstream of Junction Road is predicted to be flooded to depths of

⁶⁰ HM Government (2021) *Find out if you are at risk of flooding in England*. Available online at: <https://www.gov.uk/check-flood-risk>

⁶¹ Ministry of Housing, Communities and Local Government (2014), *Flood risk and coastal change*. Available online at: <https://www.gov.uk/guidance/flood-risk-and-coastal-change>

approximately 1 metre(m). However, it should be noted that this scenario would constitute an extreme event.

Traffic and transport

16.4.3 The route of the Proposed Scheme crosses three vehicular routes which will require the construction of three at-grade level crossing at the following locations:

- Northbridge Street: an unclassified single carriageway local road that is managed by East Sussex County Council (ESCC);
- A21(T) Robertsbridge bypass: a single carriageway trunk road that is subject to the national speed limit. The bypass is managed by Highways England; and
- B2244 Junction Road: a local road that is subject to a 60 miles per hour (mph) speed limit in this location. The road is managed by ESCC.

16.4.4 The route of Proposed Scheme also crosses a bridleway at Salehurst, a public footpath just east of the A21 and two public footpaths in the vicinity of Robertsbridge.

16.4.5 Traffic flow data was gathered in 2019 for the A21 in the vicinity of the proposed level crossing for those public holidays when the railway is expected to be at its busiest, with the results presented in **Table 16.3**.

Table 16.3: Summary of A21 2019 bank holiday traffic flows

Peak Periods	09.00-17.00 Webtris Data (Two-Way)
Easter Monday	11,653
Good Friday	11,539
New Year's Day (2019)	7,721
May Day	13,367
Late May Bank Holiday	10,861
August Bank Holiday	10,970

16.4.6 Personal Injury Accident (PIA) data has been obtained from 'Sussex Safer Roads Partnership', which operates on behalf of Sussex Police for the highway network in the vicinity of the site. For the most recently available five-year period (February 2015 to January 2020) a total of four accidents were recorded on the section of the A21 in the vicinity of the proposed level crossing. Three of these accidents were classified as light and one as serious.

Wind

- 16.4.7 The average January wind speed in Robertsbridge between 2011 and 2021 was 21 kilometres per hour (kph), which is classified as force 4 on the Beaufort Wind Force Scale (moderate breeze). In comparison during the Great Storm of 1987 a gust of 160 kph was recorded at Gatwick Airport approximately 64km from the route of the Proposed Scheme.
- 16.4.8 Due to the impacts of climate change, there is a higher risk of the UK being subject to dangerous high winds such as those experienced in 1987. As an example, Storm Bella in December 2020 brought heavy rain and strong winds to large part of the UK and the Needles on the Isle of Wight recorded gusts of 170kph.

Steam trains

- 16.4.9 There are fourteen steam locomotives associated with the Kent and East Sussex Railway. Of these fourteen, four trains are currently in service. The remaining trains are in various stages of restoration and repair such is the nature of the heritage railway industry aim to return rolling stock to operational status. The four operational steam trains are:
- Class LB&SCR A1 Class. Built in 1880. Returned to service at KESR- November 2020;
 - Class S100. Built between 1942 and 1944. Returned to service in 2017 following an overhaul;
 - Class Austerity. Built in 152/53. Returned to service in April 2018 following a major overhaul;
 - Class GWR 1600 Class. Built 1951. Returned to service in 2016 following a major overhaul.

16.5 Mitigation

- 16.5.1 The Proposed Scheme will be designed to reduce as far as practicable the risk of major events occurring. A guiding principle of safety risk management for the Proposed Scheme is to manage all risks to be As Low As Reasonably Practicable (ALARP). Comprehensive demonstration to the regulator, the Office of Rail and Road (ORR), that the risk of accidents is being managed to ALARP is a fundamental requirement of the licence to operate a railway. It should also be noted that the K&ESR must comply with the health and safety requirements appropriate to heritage railways of this size and operation as set out by the ORR.
- 16.5.2 Existing procedures developed by the K&ESR will be revised, if necessary, to reflect any extension to the railway. A number of measures will be put into place to ensure that the identified hazards will not result in a major event and therefore, avoid a significant adverse effect on the environment.

Flood Risk and Wind

- 16.5.3 The railway will be closed and train services will cease if flooding is expected. K&ESR have procedures for reporting floods and running trains during flood conditions. The procedures include actions in response to Flood Alerts, Flood Warnings and Severe Flood

Warnings issued by the Met Office and the Environment Agency. The procedures include provision of watchmen and patrolmen to observe parts of the railway likely to be affected by flooding and provision for the closure of the railway line/cancellation of train services. The procedures include inspection of the railway line and structures prior to recommencing services.

- 16.5.4 With respect to risks associated with high winds, K&ESR will review the weather forecast 24 hours in advance of each operational day to identify any potential weather warnings that have been issued by the Met Office. The railway will be inspected for any dangerous debris following such events and trains will proceed with caution at such a speed that they can stop short of any obstructions.

Traffic and Transport

- 16.5.5 With respect to the proposed level crossing on the A21(T) a Safety Risk Assessment (SRA) has been prepared in accordance with the requirements of GG104 *Requirements for Safety Risk Assessment*. This has concluded that all hazards are shown to have low risk value following mitigation. In particular, the evaluation of reasonably foreseeable risks has shown that the operation of an at-grade level crossing on the A21(T) would meet the objective of being acceptable in terms of safety risk for all populations. It is expected to have a lower risk than a level crossing associated with the national rail network because:
- There will be restrictions on the number of days that the railway operates every year and the times on those days when services can run. For example, condition 21 of the extant planning permission prohibits the railway from operating during peak periods i.e. between 07.00 and 09.00 and between 17.00 and 19.00 on weekdays and bank holidays;
 - Fewer trains will run in winter when poor weather and visibility is more likely to occur;
 - A speed limit of 10mph will be imposed on trains using the level crossing; and
 - An Automated Full Barrier Crossing Locally Monitored (AFBCL) will be used which provides full barrier closure with obstacle detection equipment. Unlike the standard full barrier type crossings, the alarms will remain on when the barriers have completed their descend and will stay on until the red lights stop flashing.
- 16.5.6 The rails and encapsulation together with the concrete surface of the crossing will be inspected every week by a competent railway track technician who patrol the permanent way ensuring the integrity of all safety critical components of the permanent way. In addition, the crossing rails and surface will be inspected by an independent engineer once a year who will report the findings of inspection to the railway operator. The engineer will be competent in the design and maintenance of this type of crossing and their performance.
- 16.5.7 The barrier equipment and its control system will be installed using the latest proven and reliable technology. The equipment has 24 hour remote application fault reporting that will send fault messages to a competent technician who has been accredited by the level crossing manufacturer to maintain, fault find and repair. All the equipment is positioned well away from the carriageway allowing safe access for maintenance.

- 16.5.8 Should there be a failure of the barrier machines the barriers will remain in the upright position with the railway closed to trains until repair is completed. The crossing amber and red flashing lights are high performance, long life LED units that will only require lens and backboard cleaning at a periodicity recommended by the manufacturer. The level crossing equipment will be inspected once a year by a representative of the manufacturer and a report of the findings of inspection will be given to the railway operator and acted upon in accordance with Safety Management System

Steam trains

- 16.5.9 K&ESR have in place procedures in place to manage the inspection and maintenance of operational rolling stock. Inspection and maintenance functions are undertaken by suitably experience individuals.

16.6 Assessment of impacts and effects

- 16.6.1 **Table 16.4** presents the results of the stage 2 assessment:

Table 16.4: Stage 2 Assessment

Hazard	Receptor	Receptor sensitivity	Impact magnitude	Project phase	Predicted effect	Proposed mitigation	Predicted residual effect
Flooding	Population	High	Low	Operational	Moderate (significant)	see section 4	Negligible (not significant)
Flooding	Biodiversity	Medium	Low	Operational	Minor (not significant)	see section 4	Negligible (not significant)
High winds/storm	Population	High	Medium	Operational	Major (significant)	see section 4	Negligible (not significant)
Train/vehicle accident	Population	High	High	Operational	Major (significant)	see section 4	Negligible (not significant)
Explosion/fire	Population	High	Low	Operational	Moderate (significant)	see section 4	Negligible (not significant)

- 16.6.2 It can be concluded that following the implementation of all mitigation measures the Proposed Scheme will not generate any significant adverse environmental effects as a result of its vulnerability to a major event. All risks will be managed to ALARP.

17.0 Climate Change

17.1 Specialist experience

- 17.1.1 Andrew Curry is an Air Quality and Climate consultant with Temple Group. He has a BSc (Hons) in Geography and a MSc in Renewable Energy. Andrew has over three years' experience in the undertaking climate change assessment work for EIA chapters.

17.2 Introduction

- 17.2.1 A changing climate has the potential to fundamentally affect the world around us and the way we live. The Climate Change Act (2008) set up a framework for the UK to achieve its long-term goals of reducing greenhouse gases and develop a climate change adaption programme. The 2017 Infrastructure Planning EIA Regulations seek to account for climate in greater detail than before and requires a description of 'the impact of the project on climate', and 'the vulnerability of the project to climate change' Schedule 4, paragraph 5(f).
- 17.2.2 The chapter considers:
- The impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change).

Scope of Assessment

- 17.2.3 This chapter of the ES assesses the likely significant climatic effects of the Proposed Scheme in terms of climate change.
- 17.2.4 The Institute of Environmental Management and Assessment (IEMA) has developed a framework for assessing greenhouse gas emissions and assessing their significance and a methodology for assessing and climate change adaptation, outlined in Section 17.4.
- 17.2.5 To reflect these two sets of guidance, this chapter is structured so that the two distinct elements; the assessment of greenhouse gas (GHG) emissions expected to be generated by the Proposed Scheme and climate change adaptation/ resilience, are covered separately under the main sections of this chapter:
- assessment methodology;
 - baseline conditions and the anticipated future conditions;
 - likely significant environmental effects and embedded mitigation;
 - additional mitigation measures required to prevent, reduce or offset any significant adverse effects;
 - residual effects; and
 - cumulative effects.
- 17.2.6 Intra-project effects which are the combined effects of individual topic impacts on a particular sensitive receptor are considered in Chapter 19.

17.3 Key Legislation, Policy and Guidance Considerations

- 17.3.1 The climate change assessment was undertaken within the context of relevant planning policies, guidance documents and legislative instruments.

Legislation and Regulation

Climate Change Act 2008

- 17.3.2 The Climate Change Act 2008⁶² sets up a framework for the UK to achieve its long-term goals of reducing greenhouse gas emissions by 34% over the 1990 baseline by 2020 and by 100% by 2050 and to ensure steps are taken towards adapting to the impact of climate change. The Act introduces a system of carbon budgeting which constrains the total amount of emissions in a given time period, and sets out a procedure for assessing the risks of the impact of climate change for the UK, and a requirement on the Government to develop an adaptation programme.
- 17.3.3 The Act introduced new powers and duties on climate change adaptation and mitigation. For adaptation it established a:
- UK-wide Climate Change Risk Assessment that must take place every five years;
 - National Adaptation Programme which must be put in place and reviewed every five years to address the most pressing climate change risks;
 - Government power to require 'bodies with functions of a public nature' and 'statutory undertakers' - for example, water and energy utilities - to report on how they have assessed the risks of climate change to their work, and their response;
 - Adaptation Sub-Committee of the independent Committee on Climate Change (CCC) in order to oversee progress on the national programme and advise on the risk assessment; and
 - Legally-binding net zero 2050 target.

The UK Climate Change Risk Assessment 2017

- 17.3.4 The Government and its Adaptation Sub-committee published the second UK Climate Change Risk Assessment (CCRA)⁶³ in January 2017, the five years after the first in 2012. The CCRA has drawn upon the evidence base⁶⁴ for a range of potential impacts of climate change in a UK context.

⁶² HMSO (2008): Climate Change Act 2008 (2050 Target Amendment) Order 2019.

⁶³ HM Government (2017): UK Climate Change Risk Assessment 2017
(https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/584281/uk-climate-change-risk-assess-2017.pdf)

⁶⁴ Department for Communities and Local Government (2019): National Planning Policy Framework

-
- 17.3.5 In order to assess climate risks in a consistent way, and to facilitate action being focused on the most pressing risks, the Adaptation Sub-Committee took a three-step approach to assess the urgency of additional action for each climate risk and opportunity:
- Considering the magnitude of the risk now and in the future;
 - Taking into account policies and adaption plans already in place to manage the risks; and
 - Considering the potential benefits of further action.
- 17.3.6 The Adaptation Sub-Committee's full Evidence Report⁶⁵ comprises an overarching Synthesis Report, which summarises the conclusions of eight technical chapters and highlights priority risks across different sectors where additional action is recommended in the next five years.
- 17.3.7 **Figure 17.1** shows the 'urgency scores' for 56 individual risks and opportunities identified in the Evidence Report.
- 17.3.8 Of particular relevance to the Proposed Scheme are those relating to 'risks to infrastructure', which are considered later in this chapter.

⁶⁵ <https://www.theccc.org.uk/uk-climate-change-risk-assessment-2017/>

Figure 17.1 Findings of the CCRA Evidence Report

MORE ACTION NEEDED	RESEARCH PRIORITY	SUSTAIN CURRENT ACTION	WATCHING BRIEF
Ne1: Risks to species and habitats from changing climate space	Ne3: Changes in suitability of land for agriculture & forests	Ne9: Risks to agriculture, forestry, landscapes & wildlife from pests/pathogens/invasive species	Ne14: Risks & opportunities from changes in landscape character
Ne2: Opportunities from new species colonisations	Ne7: Risks to freshwater species from high water temperatures	Ne10: Extreme weather/wildfire risks to farming, forestry, wildlife & heritage	In7: Low/high riverflow risks to hydroelectric generation
Ne4: Risks to soils from increased seasonal aridity and wetness	Ne13: Ocean acidification & higher water temperature risks for marine species, fisheries and marine heritage	Ne11: Saltwater intrusion risks to aquifers, farmland & habitats	In8: Subsidence risks to buried/surface infrastructure
Ne5: Risks to natural carbon stores & carbon sequestration	In5: Risks to bridges and pipelines from high river flows/erosion	In13: Extreme heat risks to rail, road, ICT and energy infrastructure	In10: Risks to electricity generation from drought and low flows
Ne6: Risks to agriculture & wildlife from water scarcity & flooding	In11: Risks to energy, transport & ICT from high winds & lightning	In14: Benefits for infrastructure from reduced extreme cold events	PB3: Opportunities for increased outdoor activity in warmer weather
Ne8: Risks of land management practices exacerbating flood risk	In12: Risks to offshore infrastructure from storms and high waves	PB13: Risks to health from poor water quality	PB12: Risks of food-borne disease cases and outbreaks
Ne12: Risks to habitats & heritage in the coastal zone from sea level rise; loss of natural flood protection	PB2: Risks to passengers from high temperatures on public transport	PB14: Risk of household water supply interruptions	Bu4: Risks to business from reduced access to capital
In1: Risks of cascading infrastructure failures across interdependent networks	PB6: Risks to viability of coastal communities from sea level rise	Bu3: Risks to business operations from water scarcity	Bu7: Business risks/opportunities from changing demand for goods & services
In2: Risks to infrastructure from river, surface/groundwater flooding	PB7: Risks to building fabric from moisture, wind, and driving rain	Bu6: Risks to business from disruption to supply chains	It7: Opportunities from changes in international trade routes
In3: Risks to infrastructure from coastal flooding & erosion	PB8: Risks to culturally valued structures and historic environment		
In4: Risks of sewer flooding due to heavy rainfall	PB10: Risks to health from changes in air quality		
In6: Risks to transport networks from embankment failure	PB11: Risks to health from vector-borne pathogens		
In9: Risks to public water supplies from drought and low river flows	Bu2: Risks to business from loss of coastal locations & infrastructure		
PB1: Risks to public health and wellbeing from high temperatures	Bu5: Employee productivity impacts in heatwaves and from severe weather infrastructure disruption		
PB4: Potential benefits to health & wellbeing from reduced cold	It2: Imported food safety risks		
PB5: Risks to people, communities & buildings from flooding	It3: Long-term changes in global food production		
PB9: Risks to health and social care delivery from extreme weather	It5: Risks to the UK from international violent conflict		
Bu1: Risks to business sites from flooding	It6: Risks to international law and governance		
It1: Weather-related shocks to global food production and trade			
It4: Risks from climate-related international human displacement			

KEY TO CHAPTERS:

- Chapter 3: Natural environment and natural assets
- Chapter 4: Infrastructure
- Chapter 5: People and the built environment
- Chapter 6: Business and industry
- Chapter 7: International dimensions

The National Planning Policy Framework

17.3.9 The NPPF 2019⁶⁴ describes ways in which the challenge of climate change can be met. It states that “new development should be planned for in ways that:

- i) *“avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure; and*
- ii) *can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government’s policy for national technical standards.”*

17.3.10 To help increase the use and supply of renewable and low carbon energy and heat, plans should:

- i) *“provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);*
- ii) *consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and*
- iii) *identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers”.*

Planning Practice Guidance

17.3.11 Planning Practice Guidance (PPG)⁶⁶ supports the NPPF. Climate change PPG states:

“In addition to supporting the delivery of appropriately sited green energy, effective spatial planning is an important part of a successful response to climate change as it can influence the emission of greenhouse gases. In doing so, local planning authorities should ensure that protecting the local environment is properly considered alongside the broader issues of protecting the global environment. Planning can also help increase resilience to climate change impact through the location, mix and design of development.”

Local Planning Policy

Rother District Council Core Strategy

17.3.12 The RDC Core Strategy⁶⁷ was adopted in September 2014. Policies related to climate change include:

17.3.13 Policy SRM1: Towards a low carbon future

⁶⁶ Ministry of Housing, Communities & Local Government, Climate Change Planning Practice Guidance, <https://www.gov.uk/guidance/climate-change>, site accessed 10 September 2018

⁶⁷ Rother Local Plan Core Strategy (2014) : Core Strategy with Detailed Policies

“The strategy to mitigate and adapt to the impacts of climate change is to:

- Reduce the carbon emissions from existing buildings by encouraging application of prevailing standards to whole buildings when extending them, supporting adaptations to be energy efficient, promoting take-up of Government energy efficiency schemes and supporting community-based energy infrastructure initiatives;*
- Promoting more sustainable travel patterns in accordance with transport policy TR2, and through widespread fast broadband coverage;*
- Adaptation through building in resilience to anticipated climatic changes, including through green infrastructure;*

Policy SRM2: Water Supply and Wastewater Management

“Effective management of water resources will be supported by [...]:

- Ensuring that all development incorporates water efficiency measures appropriate to the scale and nature of the use proposed.*
- The promotion of sustainable drainage systems to control the quantity and rate of run-off as well as to improve water quality wherever practicable [...];*

Environment Strategy 2020 – 2030: Rother District Council

17.3.14 This Environment Strategy produced by the Rother District Council, sets out action plans for how it will deliver its commitment to make the Rother District carbon neutral by 2030⁶⁸. This includes action plans regarding: Smart Digital District, Green Economy, Air Quality, Waste, Energy, Biodiversity, construction and existing buildings, as well as an environmentally friendly council. Through this strategy, they have pledged to:

- “We will work with partners to improve the standard, environmental impact and frequency of public transport as well as promoting its use.”*
- “We will support communities to develop localised energy solutions.”*
- “We will encourage suitable low carbon and renewable energy development schemes through the Local Plan Review.”*
- “We will consider the introduction of a levy to support offsetting carbon impact of new developments.”*
- “We will set up a ‘meet the target’ page on the Rother District Council website which includes all reported tree planting and shows progress to ‘doubling tree cover’ in Rother”*

Other Relevant Policy, Standards and Guidance

Whole Life Carbon Assessment for the Built Environment

⁶⁸ Environment Strategy 2020-2030 (2020) Rother District Council)

- 17.3.15 In November 2017, RICS published a professional statement on Whole Life Carbon Assessment for the Built Environment⁶⁹, which provides requirements and supporting guidance for conducting whole life carbon assessments in line with EN 15978. It provides mandatory requirements on assessing the carbon emissions arising from built projects, including infrastructure, throughout their life.

PAS2080: Carbon Management in Infrastructure

- 17.3.16 The PAS2080⁷⁰ was introduced in 2016, and looks at the whole life cycle of the carbon used on projects and promotes reduced carbon, reduced cost infrastructure delivery and a culture of challenge in the infrastructure value chain where innovation can be fostered.

The Fifth Carbon Budget

- 17.3.17 The 2008 Climate Change Act⁷¹ requires the UK to significantly reduce GHG emissions by 2050, and that climate change risks are prepared for. In order to do this the Act requires the government to set legally-binding 'carbon budgets' to ensure the 2050 targets are reached. The first 5 carbon budgets have been put into legislation and run until 2032. The Committee on Climate Change advises on the appropriate level of each carbon budget. The budgets are designed to reflect a cost-effective way of achieving the UK's long-term climate change objectives.
- 17.3.18 The budgets run over different time scales with the 4th Carbon budget runs from 2023-2027 (construction phase) and the fifth carbon budget running from 2028 to 2032 (operational phase). The fourth and fifth budgets have been adopted for this Chapter as it represents when the scheme will be constructed and operational.
- 17.3.19 The fifth carbon budget document⁷², produced by the Committee on Climate Change (CCC), reports on UK carbon budgets by sector, and reductions that need to be achieved for the UK to meet its target of 100% by 2050. It includes historical and projected GHG emissions and reports on how the UK's power network is expected to be decarbonised. UK Greenhouse Gas Statistics
- 17.3.20 The Department for Business, Energy and Industrial Strategy (formerly the Department of Energy and Climate Change) reports on energy and emissions projections by source, and reports on GHG emissions from a geographical perspective⁷³. This allows a review of trends over the period 2005-2015 for a particular Local Authority to be undertaken.

⁶⁹ RICS Professional Standards and Guidance (Nov 2017) Whole Life Carbon Assessment for the Built Environment

⁷⁰ BSI (2016): PAS2080 Carbon Management in Infrastructure

⁷¹ Climate Change Act (2008): (2050 Target Amendment) Order 2019

⁷² Committee on Climate Change (2015): The Fifth Carbon Budget, UK, Committee on Climate Change

⁷³ Department for Business, Energy & Industrial Strategy (2017): UK local authority and regional carbon dioxide emissions national statistics: 2005-2015 (<https://www.gov.uk/government/collections/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics>)

17.3.21 They have also published conversion factors for GHG reporting⁷⁴.

UK GHG Statistics

17.3.22 The Department for BEIS reports on energy and emissions projections by source, and reports on GHG emissions from a geographical perspective⁷⁵. This allows a review of trends over the period 2005-2015 for a particular Local Authority to be undertaken. They have also published conversion factors for GHG reporting⁷⁶.

WebTAG Data Book

17.3.23 The Department for Transport produces transport analysis guidance (TAG)⁷⁷ (Ref. 16.8) on how the UK's modal mix (diesel, petrol, electric) will change over time, as well as carbon dioxide emissions for different transportation modes (and projections for future efficiency).

One Click LCA Software

17.3.24 One Click LCA (Life cycle assessment) Software developed by Bionova Ltd⁷⁸ has been used to calculate the environmental impacts, in the form of tonnes of carbon dioxide equivalent (tonnes CO₂e) from the embodied carbon in the construction of the Proposed Scheme. Life Cycle Assessment is a scientific methodology used to calculate the environmental impacts, including carbon footprint, of a product, service, or process. It is possible to calculate the LCA of a project to find out how it will affect the environment through its whole existence, from extraction of raw materials to construction phase, use, and finally demolition and disposal⁷⁹. One Click LCA is compliant with EN 15978 and is also PAS 2080 compatible which is the method adopted for this assessment.^{Error! Bookmark not defined.}

IEMA Environmental Impact Assessment Guide to Climate Change Resilience and Adaption

17.3.25 The Institute of Environmental Management & Assessment (IEMA) has developed a framework for considering climate change resilience and adaption within the EIA process in line with the 2014 European Union Directive⁸⁰. The guide is designed to ensure that both climate change resilience and adaption is incorporated in any future developments in the UK.

⁷⁴ Department for Business, Energy & Industrial Strategy (2017): Greenhouse gas reporting: conversion factors 2017

⁷⁵ Department for Business, Energy & Industrial Strategy (2017): UK local authority and regional carbon dioxide emissions national statistics: (<https://www.gov.uk/government/collections/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics>)

⁷⁶ Department for Business, Energy & Industrial Strategy (2017): GHG reporting: conversion factors 2017

⁷⁷ Department for Transport (2017): WebTAG Transport Analysis Guidance data book, December 2017

⁷⁸ One Click LCA, Bionova Ltd 2018.

⁷⁹ One Click LCA, 10 essential facts about building life cycle assessment, site accessed 17/09/2020

⁸⁰ IEMA (2015) Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation

17.3.26 This Guide was updated in June 2020⁸¹ adding two new procedural steps which should be followed in the ES process.

IEMA Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance

17.3.27 The approach to assessing the potential impact of the Proposed Amendments on climate change will follow the IEMA guidance 'Assessing Greenhouse Gas Emissions and Evaluating Their Significance' (2017)⁸². This guidance describes how a proportionate assessment of a development's potential impact on climate can be achieved and how to communicate the results in terms of a notional percentage contribution relative to a carbon budget, accounting for achievable mitigation.

17.4 Climate Change Mitigation – Assessment Methodology

17.4.1 The methodology applied to the climate change mitigation assessment follows the IEMA guidance⁸³. The significance criteria used for this assessment was determined using expert judgement.

17.4.2 The goal and scope of undertaking this assessment is to:

- Identify the existing sources of GHG currently at the site, and consider how these may change under a 'do-minimum' scenario;
- Identify the likely sources of GHG emissions arising from the construction, operation and decommissioning of the Proposed Scheme, and quantify them as far as practical; and
- Consider measures in which different alternatives (such as development type, construction methodology, operating mechanisms, and end of life uses) can demonstrably reduce GHGs.

Determination of Baseline

17.4.3 The existing baseline GHG emissions from the site have been assumed to be zero (a reasonable worst case). There will in reality already be emissions associated with vehicle traffic of the three highways crossed by the Proposed Scheme. There is also expected to be a relatively small amount of carbon sequestration from existing vegetation within the Proposed Scheme footprint, but this is unlikely to materially affect the overall carbon balance.

17.4.4 In terms of a future baseline, considering known trends and policy support for reducing GHG emissions, it is considered that in the case of a 'do nothing' scenario, there would be reductions in emissions over the coming years resulting from aspects such as electric

⁸¹ IEMA (2020) Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation

⁸² IEMA (2017) Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance

vehicles replacing petrol/diesel and decarbonising the National Grid. This is not expected to affect the assessment.

Methodology for Assessment

17.4.5 This assessment adopts a project lifecycle approach to identify ‘hot spots’ of GHG emissions (i.e. the lifecycle stages likely to generate the largest amount of GHG emissions), and correspondingly enables priority areas for mitigation to be identified. This approach is consistent with the principles set out in IEMA guidance⁸².

17.4.6 Key data to calculate emissions include:

- Waste produced from enabling works and construction activities;
- Embodied emissions within construction materials;
- Transport of construction materials;
- Number of construction workers predicted and an assumed daily travel commute distance;
- Regulated and unregulated operational emissions; and
- Reuse and disposal of materials during maintenance and at the end of life.

Study Boundaries

17.4.7 The geographical scope includes the footprint of the Proposed Scheme which follows along the extension of the trainline. However, some of the GHG emissions associated with the Proposed Scheme occur beyond the boundary of the Site, for example embodied GHG emissions from materials used and GHG emissions from transport of materials and people associated with the Site.

17.4.8 The impact from GHG emissions is a national and global issue, therefore the potential impact of the associated GHG emissions of the Proposed Scheme has been assessed by comparing these against the UK’s carbon budgets.

Significance Criteria

17.4.9 As stated in the IEMA Guidance⁸² “*GHG emissions have a combined environmental effect that is approaching a scientifically defined environmental limit, as such any GHG emissions or reductions from a project might be considered to be significant*”. It goes on to explain that there is no single preferred method to evaluate significance, but the greater the project’s carbon budget (i.e. magnitude of change), the greater its significance. Unlike other EIA topics, sensitivity is only considered for a single receptor (i.e. the whole planet), and therefore it is the magnitude that drives significance. It is therefore practical to base the assessment on professional judgement, and in a qualitative and comparative manner”.

17.4.10 Therefore, the following are descriptions of different levels of effect assessed (all compared to the baseline GHG emissions):

- Major beneficial – A substantial reduction of GHG emissions;
- Moderate beneficial – A notable reduction of GHG emissions;

- Minor beneficial – A slight reduction of GHG emissions;
- Negligible – An imperceptible change in GHG emissions;
- Minor adverse – A slight increase of GHG emissions;
- Moderate adverse – A notable increase in GHG emissions; and
- Major adverse – A substantial increase in GHG emissions.

- 17.4.11 The IEMA EIA Climate Change Resilience and Adaptation Guidance, updated in 2020 introduced a new significance aspect which should be considered in a climate change assessment.
- 17.4.12 'In-Combination' climate impacts should be assessed in that consideration should be given to whether completely new effects will arise as a result of the development during construction and/or operation with the future climate conditions.
- 17.4.13 The assessment should identify whether the additional effects of future climate impacts alter the sensitivity and/or magnitude of the effect so that the significance/level of significance of the effects within other topics identified against baseline conditions changes.
- 17.4.14 To assess the impact of the emissions from the Proposed Scheme, the relevant UK carbon budget has been used. The UK carbon budgets are in place to restrict the amount of GHG emissions the UK can legally emit in a five-year period.
- 17.4.15 The appropriate UK national carbon budget during the construction programme of the Proposed Scheme is the 4th carbon budget for 2023-2027.
- 17.4.16 The operational phase of the Proposed Scheme will be compared to all of the available carbon budgets within the design life of the development. These include the 4th carbon budget for 2023-2027, and the 5th carbon budget for 2028-2033.
- 17.4.17 **Table 17.1** shows the current and future UK carbon budgets up to 2033, which highlights a decline in the amount of GHG emissions that the UK can legally emit going into the future. This means that any source of emissions contributing to the UK's carbon inventory is going to have an increased impact on the UK carbon budgets in the future.

Table 17.1: Relevant Carbon Budgets for the Assessment

Carbon budget	Total budget (MtCO ₂ e)
4 th (2023-2027)	1,950
5 th (2028-2033)	1,725

Limitations and Assumptions

- 17.4.18 In terms of site enabling and construction phase vehicle movements, an average trip distance of 15 miles has been assumed per heavy goods vehicle (HGV) and light goods vehicle (LGV) trip.

- 17.4.19 Due to the design stage of construction methodology, information is not yet available to disaggregate GHG emissions associated with worker transport and fuel consumption by site enabling/ construction. A qualitative assessment has therefore been undertaken.

Climate Change Adaptation

Approach

- 17.4.20 IEMA's guidance 'Climate Change Resilience and Adaptation' (2015)⁸⁰ presents a methodology for the consideration of climate change resilience and adaptation in the EIA process, which has been followed in this assessment. This guidance was updated in June 2020 to include two new main steps to be considered in climate change adaptation.
- 17.4.21 The main steps include:
0. Pre-EIA Stage: How has climate resilience and adaptation been embedded in the design;
 1. Scoping Climate Change Adaptation into the EIA;
 2. Defining the Future Baseline;
 3. Identifying Climate Change Vulnerability;
 4. Identifying and Determining Magnitude of Effects;
 5. Significance Assessment;
 6. Develop Mitigation Measures; and
 7. Post-EIA Stage: Monitoring and Adaptive Management.
- 17.4.22 It should be noted that climate resilience and adaptation measures required under Step 0 have been embedded into the design.
- 17.4.23 The 2020 IEMA guidance introduces a new significance aspect which should be considered in a climate change assessment. 'In-Combination' impacts should be assessed in that consideration should be given to whether completely new significant effects will arise as a result of the development during construction and/or operation with the future climate conditions.
- 17.4.24 The assessment should identify whether the additional effects of future climate impacts alter the sensitivity and/or magnitude of the effect so that the significance/level of significance of the effects within other topics identified against baseline conditions changes.

Limitations and Assumptions

- 17.4.25 There are a number of limitations associated with the assessment of climate change adaptation and risks from more extreme weather. Climate projections have been used from UKCP18, under an appropriate scenario and timescale, although within that there will be fluctuations given the inherent uncertainties within the modelling underpinning this assessment.

17.4.26 Furthermore, given the long term nature of the assessment, a more broad consideration of receptor types (rather than specific receptors identified in other parts of the ES) have been used, upon which to base consideration of how projected climatic conditions could affect these. There is also no specific requirement to produce a Climate Change Adaptation Plan, or stipulation to monitor the resilience of the Proposed Scheme to the changing conditions across its lifespan. Therefore, measures set out in the Outline Adaptation Plan are provided as recommendations rather than anything the Applicant is currently committing to.

17.5 Baseline Assessment

Climate Change Mitigation

17.5.1 In order to understand trends in GHG emissions within Rother District, a review of emissions from common sources (transport, domestic and industrial/commercial) in recent years has been carried out. Data has been taken from the UK Local Authority and regional carbon dioxide emissions national statistics⁸⁴. Table 17.2 shows the breakdown of local carbon dioxide emissions between 2005 and 2018.

⁸⁴ UK Local Authority and regional carbon dioxide emissions national statistics: 2005 to 2018

Table 17.2: GHG emissions within the Rother District

Year	Industry and Commercial Total	Domestic Total	Transport Total	Grand Total	Population ('000s, mid-year estimate)	Per Capita Emissions (t)
2005	208.6	254.8	190.9	595.3	87.7	6.8
2006	214.5	255.9	187.6	596.0	88.2	6.8
2007	207.0	247.9	191.2	583.2	89.3	6.5
2008	190.5	248.1	186.6	560.5	90.1	6.2
2009	167.6	226.4	180.7	510.0	90.1	5.7
2010	184.8	245.3	177.8	541.8	90.6	6.0
2011	167.8	212.3	174.6	487.4	90.7	5.4
2012	172.4	228.5	170.9	503.0	91.1	5.5
2013	172.7	220.5	170.1	492.1	91.2	5.4
2014	158.3	188.0	174.3	449.8	92.4	4.9
2015	150.9	183.1	178.8	439.8	93.2	4.7
2016	154.0	170.9	185.0	437.8	94.0	4.7
2017	150.1	161.0	182.8	419.7	95.0	4.4
2018	147.0	159.2	181.8	413.2	95.7	4.3

Source: UK local authority and regional carbon dioxide emissions national statistics: 2005-2018^{Error! Bookmark not defined.}

- 17.5.2 When considering carbon dioxide emissions reductions alongside population growth, it can be concluded that there is a pattern of per capita emissions reduction and therefore it is expected that this trend will continue.

Site Emissions

- 17.5.3 As described previously, for the purposes of the assessment, zero emissions are assumed from the site, against which a net change will be taken.

Future Baseline

- 17.5.4 Considering known trends and policy support for reducing the UK's GHG emissions, it is considered that in the case of a 'do-minimum' scenario there would be reductions in emissions in the future. However, as the assessment is assuming a baseline of zero emissions, this is not considered further.

Climate Change Adaptation

Projections - Future Baseline

- 17.5.5 This corresponds with the following stage of the IEMA guidance:
- 3. Defining the Future Baseline;
- 17.5.6 UK Climate Projections from the 2018 Meteorological Office modelling (UKCP18) was reviewed in order to establish an appropriate future baseline. Due to the inherent uncertainty in future climate, and the vast data sets underpinning the modelling, the 'UKCP18 Factsheet: Derived Projections'⁸⁵ was used as it provided an accessible and clear summary.
- 17.5.7 Using a future assessment timeframe of 2081-2100 (representing a period when the Proposed Scheme is expected to still be in operation), over land the projected general trends of climate changes are similar to UKCP09 (the climate projections from the 2009 climate model, which has now been superseded), with a move towards warmer, wetter winters and hotter, drier summers. However, natural variations mean that some cold winters, some dry winters, some cool summers and some wet summers will still occur. All figures below are relative to the period (1981-2000), and as the Proposed Scheme is located in Rother, East Sussex, it is appropriate to consider the South East of England as the appropriate geographical location.
- 17.5.8 UKCP18 has moved away from the use of low, medium and high emission scenarios and now uses Representative Concentration Pathway's (RCPs). These are named according to the concentration of greenhouse gas modelled to occur in the atmosphere in 2100. There are 4 RCPs available in the UKCP18 climate projections: 2.6, 4.5, 6.0 and 8.5, and RCP 8.5 is the most conservative, highest-impact scenario.
- 17.5.9 The choice of RCP and time period for which climate projections are selected is an important step in defining the future climate baseline.
- 17.5.10 At 2°C of global mean warming:
- For temperature:
 - the largest warming in the UK will be in the South East where summer temperatures may increase another 3 to 4°C;

⁸⁵Met Office (2018): UKCP19 Fact Sheet Derived Projections

<https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-fact-sheet-derived-projections.pdf>

- median warming will be at least 1 to 2°C throughout the year across the whole of the UK;
- winter cool days will warm by 1 to 1.5°C across the country, whilst temperatures on warmer winter days increase by less than 1°C; and
- in summer both hot and cool days warm by 1.5 to 2°C across England.
- For precipitation:
 - changes are uncertain, but suggest slightly wetter winters and drier summers, with summer drying more in the South.

17.5.11 At 4°C of global warming, changes compared to present day have a similar spatial pattern to those at 2°C but larger:

- For temperature:
 - all seasons warm, but summers warmer than winters;
 - summer temperatures rise by another 4 to 5°C in the south of England and 3 to 4°C elsewhere in the country;
 - hot summer days warm by 4.5 to 5°C compared to present day, across much of Southern England, possibly exceeding 5°C in some locations;
 - cooler summer days warm by 4 to 4.5°C across England and up to 5°C in the south east;
 - cool winter days warm by 2.5 to 3°C across the country; and
 - warm winter days warm by 2.5 to 3°C in England.
- For precipitation:
 - median winter precipitation increases by up to 20% across most of the country;
 - median summer precipitation decreases most in the south with median reductions of up to 20 to 30% across much of the England; and
 - dry summer days decrease in precipitation by up to 50% in summer across much of southern England.

17.6 Identification and Description of Changes Likely to Generate Effect

Climate Change Mitigation

Site Preparation and Construction Phase

17.6.2 Objectives are to reduce carbon emissions from the sourcing, transportation, fabrication and construction of all materials and products and to ensure that the choices made will also help reduce future carbon emissions through subsequent life-cycle stages.

17.6.3 Potential emission sources from the site preparation phase can arise through sources such as enabling and demolition plant, vehicles used for transporting materials and waste and access to the Site, and the transportation of staff to and from the Site. Emissions from embodied carbon will also arise, being contained within the fabric of building materials.

17.6.4 Carbon dioxide equivalent (CO₂e) is a term describing greenhouse gases in a common unit. For any quantity and type of greenhouse gas 'CO₂e' signifies the amount of CO₂ which would have the equivalent global warming impact.

Operational Phase Emissions

17.6.5 The objective is to understand at the design stages, how the trainline will perform post-construction and how to ensure that in-use emissions will be minimised.

17.6.6 During the operational life of the Proposed Scheme there is a potential for GHG emissions to arise from:

- Emissions generated from the extension of the railway; and
- Indirect emissions through the use of different transport modes (e.g. visitor travel).

Maintenance and End of Life Phase Emissions

17.6.7 The objective is to capture emissions from when the materials used for the trainline have reached the end of their useful life.

17.6.8 A quantified assessment of this has not been undertaken, but reference is made to the operational management strategy, which seeks to reduce wastage and allow the reuse and recycling of materials.

Climate Change Adaptation

17.6.9 Changes in climate is explained under the baseline section but overall warmer, wetter/drier climatic conditions combined with more extreme weather events can lead to a number of effects. These can be considered in terms of the risk they pose to the Proposed Scheme directly, or they can have an in-combination effect with other impacts anticipated as part of the ES.

17.7 Assessment of Likely Significant Effects

Climate Change Mitigation

Site Preparation and Construction Phase (Emissions)

Construction Materials

Embedded Mitigation Measures

17.7.2 Rother Valley Railway is developing a partnership scheme with Network Rail to make use of the mainline interchange connection to bring bulk materials to site by rail. These materials will include suitable fill for the reinstatement of the embankments and track ballast.

- 17.7.3 The precast concrete sleepers are recycled from those taken out of main line use and are in store at Northiam where they can be supplied to the reconnection by the existing rail line.
- 17.7.4 Rail has been recycled from track taken out of main line use and is in store at Robertsbridge Junction Station.
- 17.7.5 The steel decks for the bridges are recycled from Staplehurst on the Ashford to Tonbridge Line and from Reading on the main line. They are stored within 15 miles of the project.
- 17.7.6 Storing the above bulk materials close to the project will minimise carbon emissions during transport.
- 17.7.7 Railway and bridges steel and railway sleepers will all be used from recycled materials.

Anticipated Effects

- 17.7.8 The embodied carbon associated with the building materials for the Proposed Scheme was quantified using estimated quantities of specific materials (e.g. reinforced concrete) and applying this information to the One Click LCA Business UK tool (as outlined in the methodology).
- 17.7.9 The total embodied carbon in the building's materials is approximately 2,696 tonnes of carbon dioxide equivalent (TCO_{2e}).
- 17.7.10 Given that the total design life for the infrastructure associated with the proposed development is expected to be 120 years (e.g. bridges), the effect is considered to be **minor adverse** in the context of the local carbon reduction targets and negligible at a higher spatial level (which equates to less than 1% of the national carbon budgets).

Construction Traffic

Embodied Mitigation Measures

- 17.7.11 In accordance with current RVR practice, every effort will be taken during the procurement process to source materials and workers locally to minimise emissions arising from transport. Contractors will be selected from local companies within East Sussex wherever possible to reduce travel distance to site.
- 17.7.12 Condition 16 of the existing RR/2014/1608/P planning consent requires the preparation and written agreement of a Construction Traffic Management Plan.
- 17.7.13 Certain construction materials will be delivered by rail as mentioned previously to promote a reduction in construction traffic.

Anticipated Effects

- 17.7.14 The total carbon emissions associated with transporting the materials to and from the Site was calculated by using the latest version of the Defra Emissions Factor Toolkit⁸⁶ (v.10.1). This toolkit allows to emissions to be calculated up to 2030 and utilises the total number of

⁸⁶ Defra Emissions Factor Toolkit <https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html>

vehicle movements, with assumptions being made with respect to size and assuming a standard fuel type. It has also been assumed a 15 miles total round trip for both deliveries of construction materials and that there would be transport of waste away from the Site. This is based off information provided by the applicant of indicative origin distances.

- 17.7.15 The quantity emitted will correlate with the construction traffic profile, with more being produced during peaks in construction activity. Overall, approximately 3 TCO₂e would be produced, which is considered **negligible**, and not significant.

Construction Plant

Embedded Mitigation Measures

- 17.7.16 Condition 6 of the existing RR/2014/1608/P planning consent requires the preparation and written agreement of a Construction Environmental Management Plan with the local authority. The Plan would identify environmental risk associated with construction, develop mitigation measures and provide a framework within which environmental risk is managed. As such best practice use of construction plant to avoid or minimise adverse environmental effects would be incorporated and delivered through the CEMP.

Anticipated Effects

- 17.7.17 Site enabling, demolition, excavation and construction activities will require fuel/energy to run the machinery and plant. The activities are expected to include excavation, earth moving, piling, substructure and superstructure construction, installation of rail systems and landscaping. The plant used is likely to include piling rigs, excavators, diggers, track layers, a crane, generators, etc. In addition other direct energy usage include site offices and welfare facilities, lighting, security equipment, etc.
- 17.7.18 Over the course of the programme, the total amount of carbon generated is 135 tonnes CO₂e which could be **minor adverse** and significant in a local context.

Operational Phase Emissions

Embedded Mitigation Measures

- 17.7.19 Condition 26 of the existing RR/2014/1608/P planning consent requires the preparation and written agreement of a Travel Plan with the local authority.

Anticipated Effects

- 17.7.20 During the operational life of the Proposed Scheme there is a potential for GHG emissions to arise from:
- The use of the extended trainline
 - Indirect emissions through the use of different transport modes of visitors and staff; and
 - Indirect emissions through the provision of servicing, and waste disposal.
- 17.7.21 In the absence of precise emissions factors associated with the extended trainline, the 2012 Guidelines to Defra / DECC's GHG Conversion Factors for Company Reporting

have been referred to. Based upon a 'national rail factor' (an average emission per passenger kilometre for diesel and electric trains in 2009/10) of 0.06715 kg CO₂e per pkm, and even taking account of this figure being higher for steam engines, it is still expected to emit substantially less than corresponding car traffic (0.23695 kg CO₂e per pkm for a lower medium size petrol car for example).

- 17.7.22 EMEP/European Environment Agency (EEA)'s Air Pollutant Emission Inventory Guidebook 2019 states that "Steam locomotives are now generally used for very localised operations, primarily as tourist attractions, and their contribution to emissions is correspondingly small". The intensity of train services will not increase from the extension and the frequency of trains or days of running time will also remain the same as the current baseline. The section of line that forms the reinstatement is relatively flat which improves fuel efficiency compared to the steeper gradients found on the Kent & East Sussex Line at present.
- 17.7.23 With respect to changes in emissions by visitors travelling to and from the railway, whilst the Proposed Scheme is expected to lead to overall increased numbers of visitors, the mainline connection at Robertsbridge will have consequences upon how visitors access the railway. The Rother Valley Railway Economic Impact Report⁸⁷ identifies that there would be a reduction in vehicle distance travelled by visitors as some car journeys can shift to Robertsbridge which has greater proximity to part of the railway's visitor catchment. It is likely that this benefit would however, be largely off-set by new car trips generated by the widening of the catchment the Robertsbridge connection would provide. The report also identified the potential for modal shift from road to rail for visitors. It was likely that the greatest potential for modal shift related to the longer road journeys, primarily associated with visitors from London.
- 17.7.24 The Proposed Scheme will lead to additional passengers and visitors to the railway, and this will lead to an associated increase in waste arisings and servicing requirements. However, given the relatively small scale of the extension, any increases are not expected to be material.
- 17.7.25 In the absence of detailed data, it is considered that as a reasonable worst case, the operational emissions will be no worse than a small increase in carbon emissions, leading to a negligible effect.

End of Life Phase Emissions

Anticipated Effects

- 17.7.26 Once elements of the Proposed Scheme reach the end of their design life, it is anticipated that they will be replaced by new material or structures.
- 17.7.27 These replacements are likely to result in some GHG emissions, due to construction activities (included embodied carbon within the new building materials). In line with the Proposed Scheme's current approach to material sourcing, it is anticipated that much of the replacement infrastructure would be reused from the mainline rail network.

⁸⁷ Rother Valley Railway: Economic Impacts Report. Steer (2018)

17.7.28 As this is subject to many uncertainties, a quantification of this has not been undertaken, however it is considered that the effect with no mitigation could be **minor adverse**.

Climate Change Adaptation

Identifying Receptors' Sensitivity to Climate Change and Assessing Generic Impacts

17.7.29 This part of the assessment corresponds to the following stages in the IEMA guidance:

- 3. Identifying Climate Change Vulnerability;
- 4. Identifying and Determining Magnitude of Effects;
- 5. Significance Assessment;

17.7.30 **Table 17.3** considers the receptors associated with the topics scoped into the ES, and, using professional judgement, identifies any risks to these receptors or sensitivity to climate change. Given the long-term nature of the changes, a more generic receptor description is provided. Other typical EIA topics such as ecology and landscape will also be sensitive to climate change, but have not been assessed in this ES and therefore excluded from **Table 17.3**.

Table 17.3: How Climate Change Could Affect the ES Assessments

ES Chapter	Sensitive Receptor	Potential effect of climate change	Relative Sensitivity/Risk
7: Air Quality	New and existing residents.	Hotter temperatures may result in windows being left open for longer.	Low (as other options are likely to be available).
		Extremes of dry weather may lead to increased dust generation.	Low (dust risk related primarily to construction which is to commence in the short-term and therefore less likely to be affected by longer term changes climate)
	Ecological sites	Extremes of dry weather may lead to increased dust generation and deposition.	Low (dust risk related primarily to construction which is to commence in the short-term and therefore less likely to be affected by longer term changes climate)
12: Built Heritage and Archaeology	Buried archaeological resources.	Changes to ground moisture and stability.	Low (unless deposits known about and left in-situ).
10: Noise and Vibration	New and existing residents.	Hotter temperatures may result in windows being left open for longer.	Low (as other options are likely to be available).

ES Chapter	Sensitive Receptor	Potential effect of climate change	Relative Sensitivity/Risk
		Electric vehicles would lead to traffic noise decreasing (although wetter conditions could counteract this). Cooling/ventilation plant may be installed to run for longer.	
Landscape and Visual Impact Assessment	Introduced biodiversity/greenspace and tree planting.	The planting may not be resistant to extremes of temperature and moisture causing it to die or become stunted.	Medium.

17.7.31 As shown in **Table 17.3** there is a potential for climate change to affect some, but not all, topics in this ES. The magnitude of these impacts will vary substantially because climate change can not only lead to more frequent extreme weather events, the extremity of those events and introduce combinations of weather that are unpredictable. It is possible that new significant effects could occur that would be otherwise negligible under current climate conditions.

17.8 Additional Mitigation Measures

Climate Change Mitigation

17.8.1 No further mitigation has been proposed beyond that already embedded in the scheme and described earlier in this chapter.

Climate Change Adaptation

17.8.2 It is considered that measures already embedded within the scheme builds in sufficient resilience to adapt to future climatic conditions.

17.8.3 The Kent & East Sussex Railway have a suite of operational procedures which are required for the safe operation of the railway. One of these documents is an adverse weather management procedure. In line with operational management practice these documents will be periodically reviewed to ensure their on-going validity. It is anticipated that climatic factors that may affect the operation of the railway would be captured and managed through this process.

17.9 Residual Effects

17.9.1 **Table 17.4** provides a summary of the residual effects associated with climate change mitigation (carbon and GHG emissions).

Table 17.4 Significant Residual Effects

Description of Effect	Potential impact including significance	Mitigation	Residual Effect including significance
Embodied carbon in building materials (across project lifespan)	Moderate-Minor adverse (significant)	Use of lower embodied carbon materials	Minor adverse (significant)
Carbon emissions from construction traffic	Negligible (not significant)	Use of efficient vehicles and sourcing more products locally	Negligible (not significant)
Carbon emissions from construction plant	Minor adverse (significant)	Use of efficient plant. Implementation of CEMP.	Minor adverse (significant)
Operational use of trainline	Negligible (not significant)	Improved accessibility by non-car modes. Promotion of rail travel.	Negligible (not significant)
Maintenance and end of life emissions	Minor adverse (significant)	Operational maintenance strategies adopting a reuse and recycling approach.	Minor adverse (significant)

17.9.2 It should be noted that the IEMA Guidance⁸⁸ states: “*in the absence of any significance criteria or a defined threshold, it might be considered that all GHG emissions are significant and an EIA should ensure the project addresses their occurrence by taking mitigating action*”. In this respect, whilst it is acknowledged that all emissions from the Proposed Scheme will contribute to the overall significant effect of climate change, it is considered that the project has and will adopt an appropriate and reasonable level of mitigation and the residual effects should therefore be considered appropriate in the context of this EIA.

17.9.3 With respect to climate change resilience and adaptation, the appropriate level of measures have been designed into the Proposed Scheme, and the effects of climate change over its lifetime will be taken into account.

17.10 Summary and Conclusions

17.10.1 This chapter has considered both how the proposed scheme can mitigate its effect on climate change by reducing carbon/GHG emissions throughout its life cycle, and how it can be affected by (and adapt to) a changing climate over its life cycle.

17.10.2 The baseline emissions from the Site is primarily from road traffic passing through it and attenuation from trees and vegetation. These are not expected to be material and so a zero emissions baseline has been used to assess the net changes against.

⁸⁸ IEMA (2017) Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance

-
- 17.10.3 During site preparation and enabling, the impact of emissions arising from embodied carbon in construction materials and construction plant could be minor adverse and significant in a local context.
- 17.10.4 In the operational phase, impacts associated with changes to the railway and visitors are expected to be negligible (not significant) given the small amount of extra distance travelled by the trains and the potential for some visitors to now access the railway by connection to mainline rail services.
- 17.10.5 A quantification of emissions associated with maintenance activities and end of life has not been undertaken as this is subject to many uncertainties. However, with the Applicant's Operational Maintenance Strategy in place, it is considered that the principles of re-use and recycling of materials will limit the impact to minor adverse and significant.
- 17.10.6 Risk from climate change, and opportunities to adapt to these have been identified, in accordance with the relevant guidance and climate projections. These are already embedded within the scheme through the drainage designs, appropriate ground works and foundations and vegetation planting and management. The Applicant will monitor the changes in climate in the future to ensure any in-combination effects from other environmental impacts and risks to the Proposed Scheme and its occupants/users remain acceptable.

18.0 Monitoring

- 18.1.1 The 2017 Town and Country Planning permission (RR/2014/1608/P) granted to the Proposed Scheme contained a series of conditions that relate to monitoring that the project must comply with. The planning conditions with monitoring requirements are described below:
- 18.1.2 Condition 4- Buffer zone condition: the track shall not be brought into use until a scheme for the retention and management of a buffer zone, to be at least 8m wide between the top of the railway embankment to the top of the riverbank has been submitted and approved in writing by the Local Planning Authority. Sub-item (d) specifies that the submission should include a management plan for the lifetime of the scheme.
- 18.1.3 Condition 5- Ecology Management Condition: no development shall take place until a landscape and ecology management plan and monitoring strategy, including long-term design objectives, management responsibilities and maintenance schedules and a timetable for implementation has been submitted to and approved in writing by the Local Planning Authority.
- 18.1.4 Condition 13- Verification Condition: No occupation of any part of the permitted development shall take place until a verification report demonstrating completion of works set out in the approved remediation strategy and the effectiveness of the remediation shall be submitted to and approved, in writing, by the Local Planning Authority. The report shall include results of sampling and monitoring carried out in accordance with the approved verification plan to demonstrate that the site remediation criteria have been met.
- 18.1.5 Condition 18- Queue Length Monitoring: The developer shall be required to monitor queue lengths for a period of three years from the opening date of full opening.
- 18.1.6 Condition 19- Level Crossing Maintenance Plan: No works shall commence on site until an Operational Maintenance Plan has been submitted to and approved in writing by the Local Planning Authority. The Plan is to be reviewed on an annual basis with the Highways Agency, local highway authority and any other interested parties to discuss the previous year's operations and to inform the development of the next year's management plan.

19.0 Cumulative Effects

- 19.1.1 There are two types of cumulative effect, inter-project effects (the combined impacts of two separate projects create new or different significant effects) and intra-project effects (the combined effect of two or more impacts acting upon a receptor).
- 19.1.2 A review of current approved planning consents within proximity to the Scheme has not identified any project that is likely to generate environmental effects of a scale that would contribute to the creation of new significant effects as a consequence of the construction or operation of the Scheme.
- 19.1.3 The revalidation of the ES has not identified any new or different impacts that would contribute to the creation of multiple impacts on a receptor and therefore the creation of an intra-project cumulative effect.
- 19.1.4 These conclusions align with the findings to the 2014 ES.

Appendix A – Supplementary noise and vibration information

A.1 Source Measurements of Steam Train

A.1.1 Details on survey methodology

- Simultaneous measurements of four trains passing by were undertaken at three distances from the track, 10, 25 and 60m over soft ground.
- The measurements were made along an unscreened section of track between Bodiam and Northiam Stations.
- The sound level meters at each location were mounted on a tripod approximately 1.2m above local ground level and were set to measure L_{p1s} and L_{eq1min} .
- The weather was dry.

A.1.2 Train movements

- Trains passed by the measurement locations at a speed of approximately 25mph.
- Trains measured
- USA 060 tank engine – USA tank locomotive – 5 coaches (Measurements 1 and 4)
- Stroudley terrier class 060 tank locomotive – 3 coaches (Measurements 2 and 3)

A.1.3 Baseline

- Baseline ambient noise level measured between train pass bys at all three locations was approximately $L_{Aeq,T}$ 45 to 50dB.

A.1.4 Missing measurements

- Equipment issues led to some missing data for measurements 1 and 2, however this does not affect the validity of the survey and sufficient data was collected.

A.1.5 Vibration measurements

- Measurements undertaken using a Rion DA-20 with the triaxial accelerometer mounted on a DIN plate on soft ground approximately 10m from the railway.
- The calculated eVDV for a 16 hour day is $0.29 \text{ m/s}^{1.75}$ taking the measured result for one train pass by and assuming the worst case 16 trains per day. This suggests a low probability of adverse comment according to BS 6472 and as the ES suggests, at a greater distance the vibration energy will dissipate rapidly so at the receptors at 60m the result will be substantially lower.

A.2 Steam Train Calculations

A.2.1 Calculations:

- Operational Rail noise has been calculated based on the measured survey data.

- A $L_{Aeq, 16hr}$ has been calculated on a worst case basis from the worst case measured sound exposure level (SEL) and the worst case number of trains in a day. The SEL has been derived from the highest measured $L_{Aeq, 1min}$ from the attended source measurements (Measurement 1 at 25m, 65dB – this is substantially worst case as other measurements were around 5dB lower), effectively a train pass by level. The daytime $L_{Aeq, 16hr}$ has been calculated at distances representative of receptors.

A.2.2 Assumptions

- Worst case day of 16 trains a day
- Line source propagation

A.3 Construction Calculations

A.3.1 Plant locations and heights

- All plant and activity locations have been based on detailed construction drawings and input into a CadnaA noise model as area sources (plant moving over a defined area).
- All area sources used have been modelled at a height of 1.5m, representative of a typical height of a mechanical construction plant.

A.3.2 Assumptions

- Ground absorption set to 0.75 in the model
- Receivers set to 1.5m

Appendix B – Landscape and Visual Review

Appendix C – Water Framework Directive Assessment

Appendix D - Archaeology Appendix

Appendix E – Built Heritage Appendix

Appendix F – Traffic and Transport

Appendix G - Flood Risk Assessment

Appendix H – Major Accident Hazards and Disasters

Appendix I Reference List