Rosefield Solar Farm

Consultation Report
Appendix I-1

EN010158/APP/5.2
September 2025
Rosefield Energyfarm Limited

APFP Regulation 5(2)(q)
Planning Act 2008 Infrastructure Planning
(Applications: Prescribed Forms and Procedure) Regulations 2009

Table of Contents

Appendix I-1 – Preliminary Environmental Information Report
Appendix I-1.1 - Volume 1 - Main Report
Appendix I-1.2 - Volume 5- Non-Technical Summary

Appendix I-1.1- Volume 1 - Main Report

Rosefield Solar Farm

Preliminary Environmental Information Report

Volume 1

September 2024

Table of Contents

1. Introducing Rosefield Solar Farm 1

1.1. About Rosefield Solar Farm 1

1.2. The need for Rosefield Solar Farm 2

1.3. The Applicant 3

1.4. Legislative framework and planning policy context for Rosefield Solar Farm ... 3

1.5. The purpose of a Preliminary Environmental Information Report 8

1.6. Preliminary Environmental Information Report structure 9

2. Location of Rosefield Solar Farm 11

2.1. Current land use 11

2.2. Settlements and major infrastructure 12

2.3. Existing terrain 12

2.4. Designated natural and historic assets 13

3. Description of Rosefield Solar Farm 17

3.1. Introduction 17

3.2. Project Design Parameters 18

3.3. Ground mounted Solar PV Generated Station 19

3.4. Balance of Solar System (BoSS) 21

3.5. Collector Compounds 27

3.6 Battery Energy Storage System 29

3.6. Rosefield Substation 31

3.7. Onsite Cabling 32

3.8. Ancillary infrastructure works 35

3.9. Green Infrastructure 38

3.10. Construction Phase 39

3.11. Operation Phase (including maintenance) 45

3.12. Decommissioning Activities 49

3.13. Good design and Project Principles 50

4. Reasonable Alternatives Considered 58

4.1. Introduction 58

4.2. Alternatives Considered 59

4.3. Alternative renewable technologies 67

4.4. Alternative solar technologies 67

4.5. Alternative layouts 68

4.6. Summary of Findings 73
5. Approach to the EIA 75
5.1. Environmental Impact Assessment (EIA) 75
5.2. Stakeholder engagement 76
5.3. Flexibility of design options 77
5.4. Establishing baseline conditions 83
5.5. Establishing future environmental conditions 83
5.6. Assessment scenarios considered 84
5.7. Approach to the preliminary assessment 84
5.8. Approach to mitigation 85
5.9. Difficulties and uncertainties 89
6. Air Quality 90
6.1. Introduction 90
6.2. Stakeholder engagement 90
6.3. Legislative framework, planning policy and guidance 90
6.4. Study area 93
6.5. Establishing baseline conditions 94
6.6. Environmental baseline 94
6.7. Mitigation embedded into the design 96
6.8. Optionality 97
6.9. Approach to the preliminary assessment 98
6.10. Assessment of likely effects (without additional mitigation) 100
6.11. Additional mitigation 102
6.12. Assessment of residual effects (with additional mitigation) 102
6.13. Opportunities for enhancement 13
6.14. Difficulties and uncertainties 103
6.15. Further work required to inform the ES 103
7. Biodiversity 109
7.1. Introduction 109
7.2. Stakeholder engagement 109
7.3. Legislative framework, planning policy and guidance 114
7.4. Study area 117
7.5. Establishing baseline conditions 120
7.6. Environmental baseline 122
7.7. Mitigation embedded into the design 136
7.8. Optionality 138

7.9. Approach to the preliminary assessment 141
7.10. Assessment of likely effects (without additional mitigation) 142
7.11. Additional mitigation 145
7.12. Assessment of residual effects (with additional mitigation) 148
7.13. Opportunities for enhancement 165
7.14. Difficulties and uncertainties 165
7.15. Further work required to inform the ES 166
8. Climate 168
8.1. Introduction 168
8.2. Stakeholder engagement 168
8.3. Legislative framework, planning policy and guidance 168
8.4. Study area 173
8.5. Establishing baseline conditions 174
8.6. Environmental baseline 174
8.7. Mitigation embedded into the design 178
8.8. Optionality 179
8.9. Approach to the preliminary assessment 180
8.10. Assessment of likely effects (without additional mitigation) 190
8.11. Additional mitigation 197
8.12. Assessment of residual effects (with additional mitigation) 199
8.13. Opportunities for enhancement 202
8.14. Difficulties and uncertainties 202
8.15. Further work required to inform the ES 203
9. Cultural Heritage 204
9.1. Introduction 204
9.2. Stakeholder engagement 204
9.3. Legislative framework, planning policy and guidance 205
9.4. Study area 208
9.5. Establishing baseline conditions 209
9.6. Environmental baseline 209
9.7. Mitigation embedded into the design 211
9.8. Optionality 212
9.9. Approach to the preliminary assessment 214
9.10. Assessment of likely effects (without additional mitigation) 218
9.11. Additional mitigation 220
9.12. Assessment of residual effects (with additional mitigation) 222

9.13. Opportunities for enhancement 226
9.14. Difficulties and uncertainties 226
9.15. Further work required to inform the ES 226
10. Land, Soil and Groundwater 227
10.1. Introduction 227
10.2. Stakeholder engagement 227
10.3. Legislative framework, planning policy and guidance 228
10.4. Study area 230
10.5. Establishing baseline conditions 231
10.6. Environmental baseline 232
10.7. Mitigation embedded into the design 239
10.8. Optionality 240
10.9. Approach to the preliminary assessment 241
10.10. Assessment of likely effects (without additional mitigation) 251
10.11. Additional mitigation 254
10.12. Assessment of residual effects (with additional mitigation) 256
10.13. Opportunities for enhancement 259
10.14. Difficulties and uncertainties 259
10.15. Further work required to inform the ES 260
11. Landscape and Visual 261
11.1. Introduction 261
11.2. Stakeholder engagement 263
11.3. Legislative framework, planning policy and guidance 265
11.4. Study area 268
11.5. Establishing baseline conditions 269
11.6. Environmental baseline 271
11.7. Mitigation embedded into the design 285
11.8. Optionality 288
11.9. Approach to the preliminary assessment 289
11.10. Assessment of likely effects (without additional mitigation) 296
11.11. Additional mitigation 300
11.12. Assessment of residual effects (with additional mitigation) 300
11.13. Opportunities for enhancement 333
11.14. Difficulties and uncertainties 334
11.15. Further work required to inform the ES 334
12. Noise and Vibration 335

12.1. Introduction 335
12.2. Stakeholder engagement 335
12.3. Legislative framework, planning policy and guidance 336
12.4. Study area 339
12.5. Establishing baseline conditions 339
12.6. Environmental baseline 341
12.7. Mitigation embedded into the design 344
12.8. Optionality 344
12.9. Approach to the preliminary assessment 347
12.10. Assessment of likely effects (without additional mitigation) 354
12.11. Additional mitigation 363
12.12. Assessment of residual effects (with additional mitigation) 365
12.13. Opportunities for enhancement 368
12.14. Difficulties and uncertainties 368
12.15. Further work required to inform the ES 369
13. Population 371
13.1. Introduction 371
13.2. Stakeholder engagement 371
13.3. Legislative framework, planning policy and guidance 371
13.4. Study area 373
13.5. Establishing baseline conditions 373
13.6. Environmental baseline 374
13.7. Mitigation embedded into the design 378
13.8. Optionality 378
13.9. Approach to the preliminary assessment 380
13.10. Assessment of likely effects (without additional mitigation) 387
13.11. Additional mitigation 390
13.12. Assessment of residual effects (with additional mitigation) 391
13.13. Opportunities for enhancement 392
13.14. Difficulties and uncertainties 392
13.15. Further work required to inform the ES 393
14. Transport and Access 394
14.1. Introduction 394
14.2. Stakeholder engagement 394
14.3. Legislative framework, planning policy and guidance 395
14.4. Study area 397

14.5. Establishing baseline conditions 398
14.6. Environmental baseline 399
14.7. Mitigation embedded into the design 400
14.8. Optionality 401
14.9. Approach to the preliminary assessment 403
14.10. Assessment of likely effects (without additional mitigation) 408
14.11. Additional mitigation 410
14.12. Assessment of residual effects (with additional mitigation) 413
14.13. Opportunities for enhancement 413
14.14. Difficulties and uncertainties 414
14.15. Further work required to inform the ES 414
15. Water 415
15.1. Introduction 415
15.2. Stakeholder engagement 415
15.3. Legislative framework, planning policy and guidance 416
15.4. Study area 419
15.5. Establishing baseline conditions 419
15.6. Environmental baseline 420
15.7. Mitigation embedded into the design 426
15.8. Optionality 428
15.9. Approach to the preliminary assessment 430
15.10. Assessment of likely effects (without additional mitigation) 433
15.11. Additional mitigation 435
15.12. Assessment of residual effects (with additional mitigation) 436
15.13. Opportunities for enhancement 436
15.14. Difficulties and uncertainties 437
15.15. Further work required to inform the ES 438
16. Glint and Glare 440
16.1. Introduction 440
16.2. Stakeholder engagement 440
16.3. Legislative framework, planning policy and guidance 440
16.4. Study area 442
16.5. Establishing baseline conditions 443
16.6. Environmental baseline 443
16.7. Mitigation embedded into the design 443
16.8. Optionality 444

16.9. Approach to the preliminary assessment 445
16.10. Assessment of likely effects (without additional mitigation) 450
16.11. Additional mitigation 451
16.12. Assessment of residual effects (with additional mitigation) 451
16.13. Opportunities for enhancement 451
16.14. Difficulties and uncertainties 451
16.15. Further work required to inform the ES 452
17. Other Environmental Considerations 453
17.1. Introduction 453
17.2. Heat and radiation 456
17.3. Electric, magnetic and electromagnetic fields (EMF) 456
17.4. Major accidents and disasters 457
17.5. Utilities 460
17.6. Human health 461
17.7. Material assets and waste 461
17.8. Transboundary 463
18. Cumulative 465
18.1. Introduction 465
18.2. Legislative framework, planning policy and guidance 465
18.3. Intra-project combined effects 467
18.4. Inter-project cumulative effects 471
18.5. Preliminary inter-project cumulative assessment 487
18.6. Difficulties and uncertainties 492
18.7. Further work required to inform the ES 492

1. Introducing Rosefield Solar Farm

1.1. About Rosefield Solar Farm

1.1.1. Rosefield Solar Farm is a proposed solar photovoltaic (PV) electricity generating and battery storage facility with associated infrastructure, located in Buckinghamshire.

1.1.2. Rosefield Solar Farm comprises several parcels of land (Parcel 1, Parcel 1a, Parcel 2 and Parcel 3) and a cable search area (hereafter referred to as 'the Site') as outlined on **Figure 1.1: Site Boundary** and **Figure 1.2: Zonal Masterplan** in **Volume 2**. The land parcels will be connected by a series of underground cables. Rosefield Solar Farm will establish a grid connection via underground cables to the National Grid East Claydon Substation, which will transfer the electricity to the national electricity network.

1.1.3. Rosefield Solar Farm will comprise of the following elements:

- Solar Photovoltatic (PV) development consisting of ground mounted Solar PV generating station and a Balance of Solar System (BoSS).
- Collector Compounds;
- Battery Energy Storage System (BESS) compound(s);
- A project substation ('Rosefield Substation') compound
- Site-wide operational monitoring and security equipment;
- 400kV Grid Connection Corridor to connect the Rosefield Substation and National Grid East Claydon Substation;
- Cabling to connect the Solar PV modules and the BESS to Collector Compounds, the Collector Compounds to the Rosefield Substation, and the Rosefield Substation to the National Grid East Claydon Substation;
- Ancillary infrastructure works;
- Green Infrastructure, recreation and amenity works; and
- Highways Infrastructure improvements and safety works.

1.1.4. The export capacity of Rosefield Solar Farm will exceed 50 megawatts (MW). Therefore, Rosefield Solar Farm is classified as a Nationally Significant Infrastructure Project (NSIP) and will require a Development Consent Order (DCO) under the Planning Act 2008[1].

[1] Planning Act 2008. Available online: https://www.legislation.gov.uk/ukpga/2008/29/section/14

1.1.5. Rosefield Solar Farm also falls within the definition of 'EIA development', as defined within the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (hereafter, the 'EIA Regulations')[2] meaning that before consent is granted for Rosefield Solar Farm, an EIA must be undertaken.

1.2. The need for Rosefield Solar Farm

1.2.1. Rosefield Solar Farm will help the UK build a low-carbon energy system and make an important contribution to meeting the UK Government's target of net zero carbon emissions by 2050.

1.2.2. Low carbon solar generation is essential to enabling the decarbonisation of the UK's energy system. The Overarching National Policy Statement for Energy (NPS EN-1)[3], published in November 2023, states that "***a secure, reliable, affordable, net zero consistent system in 2050 is likely to be composed predominantly of wind and solar***". NPS EN-1 now also recognises solar as a critical national priority (CNP), further highlighting the overarching need for low carbon energy infrastructure to help fully decarbonise the UK's energy system by 2035.

1.2.3. The UK Government's Energy Security Strategy[4] identifies a need for solar capacity to reach 70 gigawatts (GW) by 2030 to help meet the country's energy requirements. With the potential to power around 57,000 homes[5], Rosefield Solar Farm would make a substantial contribution to this goal.

1.2.4. The UK also needs to increase the amount of electricity it produces to help create a resilient energy network.

1.2.5. Rosefield Solar Farm would contribute towards the significant capacity of low-carbon solar generation that is urgently needed in the UK, the achievement of government net zero targets, and a secure, low carbon UK energy supply.

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[2] The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. Available online: The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (legislation.gov.uk)
[3] Overarching National Policy Statement for Energy (EN-1) (2023). Available online: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1
[4] British Energy Security Strategy (2022). Available online: British energy security strategy - GOV.UK (www.gov.uk)
[5] Based upon the average domestic electricity consumption per home (temperature corrected) per the Energy Consumption in the UK (published September 2021, Table C9 of ECUK: Consumption data tables). Available online: https://www.gov.uk/government/statistics/energy-consumption-in-the-uk-2021

1.3. The Applicant

1.3.1. Rosefield Energyfarm Limited. (also known as the 'Applicant') is a joint venture between EDF Renewables UK and Ireland and PS Renewables.

1.3.2. EDF Renewables UK and Ireland, part of the EDF Group, is one of the world's largest low carbon electricity companies. EDF Renewables UK and Ireland has an operating portfolio of 44 renewable energy sites including battery, onshore and offshore wind and solar (together totalling more than 1.5 GW) and an expanding renewables portfolio with almost 14 GW of solar and wind projects in planning and development. All this is providing much needed affordable and low carbon electricity. Our investment and innovation is reducing costs for customers and bringing significant benefits for communities. We invest in projects and the communities where they operate for the long term, remaining involved in projects over their lifetime from development, construction and operation, all the way through to decommissioning.

1.3.3. Established in 2012, PS Renewables is a globally trusted development, engineering, procurement and construction company. Over the past decade it has developed, designed and built over 30 solar farms across the UK, providing over 300 MW of clean, renewable electricity to UK homes and businesses every year.

1.4. Legislative framework and planning policy context for Rosefield Solar Farm

1.4.1. There are several legislation and planning policies that underpin Rosefield Solar Farm. These include:

- Planning Act 2008;
- NPS;
- National Planning Policy Framework (NPPF);
- Local planning policy; and
- EIA Regulations.

Planning Act 2008

1.4.2. Rosefield Solar Farm is defined as a NSIP under Sections 14(1)(a) and 15(2) of the Planning Act 2008[6], as it comprises:

[6] Planning Act (2008). Available online: https://www.legislation.gov.uk/ukpga/2008/29/contents

- The construction or extension of an electricity generating station (Part 3, Section 14(1)(a)); and
- Its capacity is more than 50 MW (Part 3, Section 15(2)(c)).

1.4.3. Therefore an application for a DCO pursuant to the Planning Act 2008 is required and will be submitted to the Planning Inspectorate as the examining authority on behalf of the Secretary of State. If granted, the DCO will provide planning consent for development and any additional consents and authorisation, where specified, removing the need for some consents (such as planning permission).

1.4.4. Section 104 of the Planning Act 2008 applies where a relevant NPS has effect. In accordance with Section 104(2) of the Planning Act 2008, the Secretary of State is required to have regard to any relevant NPS amongst other matters, when deciding whether or not to grant a DCO.

1.4.5. The primary basis for deciding whether or not to grant the DCO for Rosefield Solar Farm is the Overarching NPS for Energy (NPS EN-1)[7], NPS for Renewable Energy Infrastructure (NPS EN-3)[8] and the NPS for Electricity Networks Infrastructure (NPS EN-5)[9]. NPS EN-3 provides the specific consideration for renewable energy infrastructure. These are discussed in further detail below.

National policy statements

1.4.6. The Overarching NPS for Energy (NPS EN-1)[10] sets out the national policy for delivering major energy infrastructure in England and Wales. For renewable energy projects, NPS EN-1 has effect in combination with the relevant technology-specific NPS, which for Rosefield Solar Farm are NPS

[7] Overarching National Policy Statement for Energy (EN-1) (2023). Available online: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1
[8] National Policy Statement for Renewable Energy Infrastructure (EN-3) (2023). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3
[9] National Policy Statement for Electricity Networks Infrastructure (EN-5) (2023). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5
[10] Department for Energy Security and Net Zero. (2023). Overarching National Policy Statement for Energy (EN-1) Available online: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1

EN-3[11] and NPS EN-5[12], and together they provide the primary basis for decisions made by the Secretary of State.

1.4.7. UK Government Policy has an overwhelming focus on delivering the change in energy generation and usage that will ensure that the UK meets its legally binding target of net zero by 2050. NPS EN-1 emphasises the importance of solar in the UK's future energy mix and the benefits of the rapidity of its deployment in helping the UK meet net zero and increase energy security of supply.

1.4.8. In a planning-specific context, NPS EN-3 states the need for the timely delivery of new renewable energy sources. Paragraph 2.10.10 of NPS EN-3 stresses the importance of solar in delivering the UK Government's goals for greater energy independence. It references the British Energy Security Strategy[13], which states that the government expects a five-fold increase in solar deployment by 2035 (up to 70 GW).

1.4.9. Part 3 of NPS EN-1 identifies the need for nationally significant energy infrastructure. With regards to decision making, paragraph 3.2.1 and 3.2.2 of NPS EN-1 states how *"government's objectives* ***for the energy system are to ensure our supply of energy always remains secure, reliable, affordable, and consistent with net zero emissions in 2050 for a wide*** *range of future scenarios…we need a range of different types of energy* ***infrastructure to deliver*** *these objectives."*

1.4.10. NPS EN-1 also includes solar as a critical national priority (CNP) alongside all other low-carbon energy infrastructure. Paragraph 4.1.7 emphasises that *"for projects which qualify as CNP infrastructure, it is* ***likely that the need case will outweigh the residual effects in all but the*** *most exceptional cases".*

[11] Department for Energy Security and Net Zero. (2023). National Policy Statement for Renewable Energy Infrastructure (EN-3) . Available online: https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3

[12] Department for Energy Security and Net Zero. (2023). National Policy Statement for Electricity Networks Infrastructure (EN-5) . Available online: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5

[13] British Energy Security Strategy (2022), available online: https://www.gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy

National planning policy framework

1.4.11. Under Section 104 of the Planning Act 2008, the Secretary of State must have regard to other matters which the Secretary of State considers important and relevant, which will include national and local planning policy, such as the National Planning Policy Framework (NPPF)[14].

1.4.12. Whilst NPS EN-1, NPS EN-3 and NPS EN-5 are the primary decision-making documents for Rosefield Solar Farm, the NPPF can provide additional guidance for the assessment of NPS policy and provides relevant context for individual factor assessments to the extent that it is relevant to Rosefield Solar Farm.

1.4.13. The NPPF was published by the Department for Levelling Up, Housing and Communities (formerly the Department for Communities and Local Government) in March 2012 and updated in December 2023. The NPPF sets out the UK Government's planning policies and how these are expected to be applied in England as well as providing relevant context for individual factor assessments.

1.4.14. The NPPF does not contain specific policies for NSIPs; however Chapter 2 of the NPPF, 'Achieving sustainable development' sets out that the planning system should contribute to the achievement of sustainable development, considering economic, social and environmental roles.

Local planning policy

1.4.15. Local development plans do not carry the same weight under the Planning Act 2008 in respect of decision-making for NSIPs as they do with determining planning applications made pursuant to the Town and Country Planning Act 1990 (as amended)[15]. The aforementioned NPSs are the primary consideration for NSIP applications. Nevertheless, a local development plan is still a matter that can be considered important and relevant when determining an application for a NSIP. However in the event of any conflict the NPS prevails.

1.4.16. Rosefield Solar Farm lies within Buckinghamshire for which Buckinghamshire Council is the responsible relevant local planning authority (the 'host' planning authority). Therefore the relevant local

[14] National Planning Policy Framework (2023). Available online: https://www.gov.uk/government/publications/national-planning-policy-framework--2
[15] Town and Country Planning Act 1990. Available online: https://www.legislation.gov.uk/ukpga/1990/8/contents

planning policies of the adopted local development plan[16] for Buckinghamshire Council will be considered as part of the assessment.

EIA regulations

1.4.17. Rosefield Solar Farm is considered to be 'EIA development' as defined by Schedule 2 paragraph 3(a) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017[17] (the 'EIA Regulations') meaning that before consent is granted for Rosefield Solar Farm, an EIA must be undertaken.

1.4.18. The EIA Regulations set out the types of development which must be subject to an EIA (referred to as Schedule 1 development) and other developments (referred to as Schedule 2 development), which must only be subject to an EIA if the development is considered "***likely to have significant effects on the environment by virtue of factors such as its*** *nature, size or location"*.

1.4.19. Rosefield Solar Farm does not fall under any of the types of development set out in Schedule 1 of the EIA Regulations. However Rosefield Solar Farm is of a type and scale described in Schedule 2 paragraph 3(a) of the EIA Regulations as follows:

"Energy industry

industrial installations for the production of electricity, steam and hot water *(projects not included in Schedule 1 to these Regulations)"*

1.4.20. It is considered that due to Rosefield Solar Farm's nature, size and location, it has the potential to have significant effects on the environment. The Applicant therefore notified the Secretary of State under Regulation 8(1)(b) of the EIA Regulations that it proposes to provide an Environmental Statement (ES) in respect of Rosefield Solar Farm.

1.4.21. Regulation 12 of the EIA Regulations requires the Applicant to set out in its Statement of Community Consultation how it intends to publicise and consult on preliminary environmental information relating to Rosefield Solar Farm.

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[16] The local planning policy that is relevant to Rosefield Solar Farm is the Vale of Aylesbury Local Plan 2023 – 2033 (Adopted in September 2021). Available online: https://www.buckinghamshire.gov.uk/documents/9742/Aylesbury_local_plan_L46JWaT.pdf

[17] The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. Available online: https://www.legislation.gov.uk/uksi/2017/572/contents/made

1.4.22. Regulation 12(2) of the EIA Regulations states that the purpose of the Preliminary Environmental Information Report (hereafter 'PEIR') is to provide information reasonably required to enable consultees to develop an informed view of the likely significant environmental effects of the development being proposed.

1.4.23. Following the completion of the surveys, assessments, consultation and engagement as detailed in this PEIR, a DCO application will be made to the Secretary of State for determination in accordance with the Planning Act 2008. The DCO application will be accompanied by an ES in accordance with Regulation 5(2)(a) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009[18]. The ES will set out the methods and findings of a comprehensive EIA undertaken in line with the EIA Regulations.

1.4.24. This PEIR presents preliminary findings based on the current design. Environmental assessment work is ongoing and the design of Rosefield Solar Farm will continue to evolve following further environmental surveys, assessment and feedback from this consultation. The final proposed design and environmental assessment will be presented in the ES which will be submitted in support of the DCO application.

Consideration of planning policy in EIA

1.4.25. Within the ES, each environmental factor chapter will reference the national and local planning policies relevant to that topic of assessment. This PEIR does not consider the planning balance of Rosefield Solar Farm in line with the planning policy. This will be undertaken and set out in the Planning Statement, which will be submitted as a standalone document in support of the DCO application.

1.5. The purpose of a Preliminary Environmental Information Report

1.5.1. In accordance with the Planning Act 2008[19], guidance on the pre-application stage for NSIPs[20] , the EIA Regulations (Regulation 12)[21] and

[18] Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations (2009). Available online: The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (legislation.gov.uk)
[19] Planning Act (2008). Available online: https://www.legislation.gov.uk/ukpga/2008/29/section/14
[20] Planning Act 2008: Pre-application stage for Nationally Significant Infrastructure Projects (2024). Available online: https://www.gov.uk/guidance/planning-act-2008-pre-application-stage-for-nationally-significant-infrastructure-projects
[21] The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. Available online: The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (legislation.gov.uk)

the Planning Inspectorate's Advice Note Seven[22], this PEIR has been prepared to enable interested parties (including members of the public, local planning authorities and statutory bodies) to develop an informed view of the likely significant environmental effects of Rosefield Solar Farm and to help inform their consultation responses during this pre-application stage.

1.5.2. This PEIR outlines the environmental assessment work undertaken to date, the likely significant environmental effects identified to date, proposed 'embedded' and 'additional' mitigation and residual significant environmental effects (taking account of any additional mitigation proposed) based on the environmental baseline information currently available and the current design of Rosefield Solar Farm. This PEIR also details the further work that is required to inform the ES, which will be submitted as part of the DCO application.

1.5.3. The design of Rosefield Solar Farm, as presented in this PEIR, has been informed by the ongoing environmental assessment process and consultation and engagement responses received to date. **It does not represent the final design.** Further survey and design work is currently being undertaken to inform the design of Rosefield Solar Farm. The feedback received from this statutory consultation process will also inform further development of the design. The refined design of Rosefield Solar Farm will be reported and assessed within the ES. In order to maintain flexibility in the design, it is the Applicant's intention to use the 'Rochdale Envelope' approach within parameter ranges for the ES. Further detail on this approach is outlined in **Chapter 3: Description of Rosefield Solar Farm.**

1.6. Preliminary Environmental Information Report structure

Volume 1 – Main Document

1.6.1. Provides details on the location and description of Rosefield Solar Farm, together with a preliminary account of the likely significant environmental effects that have been identified to date as a result of the construction, operation (including maintenance) and decommissioning of Rosefield Solar Farm.

[22] Planning Inspectorate (June 2020) Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environment Information and Environmental Statements (Version 7). Available online: Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements | National Infrastructure Planning (planninginspectorate.gov.uk)

Volume 2 – Supporting Figures

1.6.2. Comprises figures to support the information detailed in **Volume 1**. The supporting figures are provided in a separate volume to enable the figures to be shown at a suitable scale to aid access and interpretation.

Volume 3 – Supporting Reports

1.6.3. Comprises a set of supporting reports, which include technical survey reports and survey data, to support the environmental information detailed in **Volume 1**.

Volume 4 – Landscape Visualisations

1.6.4. Comprises annotated photosheets for the landscape and visual viewpoints to support the information detailed in **Chapter 11** of **Volume 1**.

Non-technical summary (NTS)

1.6.5. This document provides a short summary of the preliminary assessment using non-technical language.

2. Location of Rosefield Solar Farm

2.1. Current land use

2.1.1. Rosefield Solar Farm would comprise approximately 744 hectares (ha) of land, located within Buckinghamshire as illustrated in **Figure 2.1: Location Plan** in **Volume 2**. The Site boundary, as presented in **Figure 1.1: Site Boundary** in **Volume 2**, is the anticipated maximum area of land that would be required to facilitate the construction, operation (including maintenance) and decommissioning of Rosefield Solar Farm. The Site boundary may change in response to the statutory consultation process and as the design of Rosefield Solar Farm progresses ahead of the ES and submitting the DCO application.

2.1.2. Rosefield Solar Farm extends across four parcels of land (Parcel 1, 1a, 2 and 3) which would be connected with underground cables to the existing National Grid East Claydon Substation which is located adjacent to Parcel 3, as shown in **Figure 1.2: Zonal Masterplan** in **Volume 2**. The cable route search area illustrated in **Figure 1.2** does not represent the total area required for the installation of the cabling, but rather it shows the maximum extent of land under consideration at this stage within which the cables would be installed. The cables would only be installed in part of this area.

2.1.3. The land within the Site boundary predominantly consists of agricultural fields and pastureland interspersed with hedgerows, ditches, woodland blocks and farm access tracks. The hedgerows within the Site range from dense tall vegetation with sporadic shrubs and trees present. The fields are bordered by a mix of hedgerows, trees and ditches.

2.1.4. There is some variation in the features immediately surrounding and within each of the Parcels, as presented below. **Figure 2.2: Environmental Features Plan** in **Volume 2** illustrates the features within each Parcel and surrounding the Site. This is summarised below:

- **Parcel 1**: Parcel 1 is the westernmost parcel of the Site and measures 183 ha. Parcel 1 is bordered by several woodland blocks including Shrubs Wood, Decoypond Wood and Sheephouse Wood. Calvert Road sits on the northern boundary of Parcel 1. Parcel 1 is located in close proximity to an active High Speed Rail (HS2) works area, which is located approximately 100 m south of the Site boundary.
- **Parcel 1a**: Parcel 1a is the smallest parcel (15 ha) and is located to the southeast of Parcel 1. Parcel 1a is bordered by Sheephouse Wood to the northwest, Romer and Greatsea Wood to the east and by hedgerows to the south. Parcel 1a is located in close proximity to an active HS2 works area, which is located approximately 100 m west of the Site boundary.

- **Parcel 2**: Parcel 2 is located approximately 1 km east of Parcel 1a and is 228 ha. Parcel 2 is bordered by Runt's Wood to the west, Finemere Wood to the south and the residential settlement of Botolph Claydon directly to the north.
- **Parcel 3**: Parcel 3 is the northern most parcel of land within the Site and is 55 ha. Adjacent to Parcel 3 lies the existing National Grid East Claydon Substation which will be the point of grid connection for Rosefield Solar Farm.

2.1.5. Each Parcel contains several fields. Each field has been given a unique reference (e.g. B1) as shown on **Figure 1.2: Zonal Masterplan** in **Volume 2**.

2.2. Settlements and major infrastructure

2.2.1. The location of Rosefield Solar Farm is shown on **Figure 2.1: Location Plan** in **Volume 2**. Rosefield Solar Farm is located within the administrative boundary of Buckinghamshire Council. The settlements of Calvert, Middle Claydon, Botolph Claydon, East Claydon and Hogshaw lie within 1.5 km of parts of the Site boundary. Further afield (within 3 km of the Site boundary) lie the settlements of Steeple Claydon, Edgecott, Shipton Lee, Quainton, Granborough and Winslow.

2.2.2. National Grid East Claydon Substation is the closest major infrastructure, located within Parcel 3. Traversing from this substation are three overhead power lines (400 Kilovolt (kV) transmission line), carried by pylon structures, that run across Parcel 3 to the east and south.

2.2.3. An HS2 works area is located in close proximity to the western edge of Parcels 1 and 1a. It is approximately 100 m from Parcel 1 and 1a and less than 500 m from Parcel 2. This section of HS2 is currently under construction. Permanent HS2 mitigation planting is located directly adjacent to the eastern edge of Parcel 1 and to the north and south of Parcel 1a, with a small section of mitigation planting intersecting Parcel 1a, as outlined in **Figure 2.2: Environmental Features Plan** in **Volume 2**.

2.2.4. The East West Rail railway line, which is currently under construction, is located approximately 850 m north of Parcel 1 at its closest point and runs west to east.

2.3. Existing terrain

2.3.1. Parcels 1 and 1a are gently undulating with the highest point being Knowl Hill at around 116 m above ordnance datum (AOD) as shown on **Figure 2.3: Topography Plan** in **Volume 2**. The rest of Parcel 1 is at an elevation of 80-90 m AOD. Parcel 2 is located on a low ridge crest at 136 m AOD. Parcel 3 is located on relatively flat ground at 90-94 m AOD on the northeast of the ridge.

2.4. Designated natural and historic assets

2.4.1. The Site itself does not hold any natural or historic designations, but there are numerous designations within its vicinity as illustrated in **Figure 2.2: Environmental Features Plan** in **Volume 2**.

Biodiversity

2.4.2. There are no international statutory designations within 10 km of the Site boundary.

2.4.3. There are three statutory nationally designated sites within 2 km of the Site boundary.

- Sheephouse Wood Site of Special Scientific Interest (SSSI) (adjacent to Parcel 1 and Parcel 1a);
- Finemere Wood SSSI (adjacent to Parcel 2); and
- Grendon and Doddershall Woods SSSI (approximately 1.36 km southwest of Parcel 1a).

2.4.4. There are 22 non-statutory designated sites within 2 km of the Site boundary, namely 14 Local Wildlife Sites (LWS), five Biological Notification Sites (BNS), two Wildlife Trust Reserves (WTR) and one Biodiversity Opportunity Area (BOA). Those that are adjacent to the Site boundary comprise:

- Bernwood BOA (overlaps with Parcel 1, 1a and 2);
- Shrub Woods LWS (adjacent to Parcel 1);
- Decoypond Wood LWS (adjacent to Parcel 1);
- Romer Wood LWS (adjacent to Parcel 1a);
- Runts Wood LWS (adjacent to Parcel 2);
- Finemere WTR (adjacent to Parcel 2);
- Home Wood, Middle Claydon LWS (adjacent to the cable route search area);
- Balmore Wood LWS (adjacent to the cable route search area); and
- Greatsea Wood LWS (adjacent to the cable route search area).

2.4.5. There are 52 areas of ancient woodland within 2 km of the Site boundary, of which, 33 are areas of ancient semi-natural woodland and 19 are areas of replanted ancient woodland. The closest areas of ancient woodland are both ancient semi-natural woodland and replanted ancient woodland that are directly adjacent to the Site boundary, as shown on **Figure 2.2: Environmental Features Plan** in **Volume 2**. These consist of:

- Shrubs Woods (adjacent to Parcel 1 and the cable route search area);
- Sheephouse Wood (adjacent to Parcel 1, Parcel 1a and the cable route search area);
- Romer Wood (adjacent to Parcel 1a and the cable route search area);
- Runts Wood (adjacent to Parcel 2 and the cable route search area); and
- Finemere Wood (adjacent to Parcel 2 and the cable route search area).

Landscape character

2.4.6. The southern area of Parcel 2 is situated in a local designation of Quainton-Wing Hills Area of Attractive Landscape (AAL) with Quainton Hill located approximately 2 km southeast of Parcel 2. The Chilterns National Landscape is located approximately 18 km from the Site boundary.

2.4.7. Rosefield Solar Farm is located within National Character Area (NCA) 108 Upper Clay Vales.

Historic environment

2.4.8. There are no designated cultural heritage assets located within the Site boundary.

2.4.9. The Site is situated adjacent to two Conservation Areas, Botolph Claydon and Middle Claydon. Botolph Claydon Conservation Area lies north of Parcel 2 and Middle Claydon lies to the north of Parcel 1.

2.4.10. There are six Scheduled Monuments within 5 km of the Site boundary. Five of these are medieval in date and form a Preceptory of the Knights Hospitallers, two deserted villages, a standing cross, and a moated site. One is an Iron Age slight univallate hillfort.

2.4.11. The following cultural heritage assets are also present within 5 km of the Site boundary:

- Three Registered Parks and Gardens (two Grade I and one Grade II);
- 14 Conservation Areas (including Botolph Claydon and Middle Claydon Conservation Areas);
- Eight Grade I Listed Buildings;
- 26 Grade II* Listed Buildings; and
- 404 Grade II Listed Buildings.

Geology

2.4.12. Bedrock geology across the Site comprises the following mudstone layers:

- West Walton Formation;
- Weymouth Mudstone Member;
- Stewartby Member; and
- Peterborough Member.

2.4.13. The superficial geological units within the Site include alluvium, till, glaciofluvial deposits and glacial deposits. Made ground is potentially present in localised areas associated with farm buildings or tracks, and along the route of the historical railway.

2.4.14. The Site is underlain by superficial geological units that are classified as secondary A aquifer and a secondary undifferentiated aquifer.

Water resources

2.4.15. There are no Main Rivers located within the Site. The closest Main River, River Ray, is located approximately 200 m south of Parcel 2.

2.4.16. Several minor ordinary watercourses and drainage ditches are located in the western section of Parcel 1, directly north of Parcel 1a and directly east of Parcel 3 (Claydon Brook).

2.4.17. As shown on **Figure 2.2: Environmental Features Plan** in **Volume 2**, the Site is predominately located within Flood Zone 1. There is a small section on the eastern boundary of fields within Parcel 3 adjacent to the Claydon Brook that form part of Flood Zones 2 and 3.

2.4.18. The Site is not located within a Source Protection Zone; however it is located within a Drinking Water Zone for surface water.

Access and recreation

2.4.19. Parcels 1 and 2 are bordered to the north by Calvert Road which provides direct access to Botolph Claydon and Calvert. East Claydon Road, which lies to the north of Parcel 3, provides direct access to the National Grid East Claydon Substation and the settlement of East Claydon.

2.4.20. Parcel 1a is bounded by Sheephouse Wood, Greatsea Wood and Muxwell Brook and is only accessible via a public right of way (PRoW) heading south from Knowl Hill.

2.4.21. The Site is currently accessible from several existing field accesses capable of accommodating large agricultural machinery.

2.4.22. There is an extensive network of PRoW and bridleways within and adjacent to the Site, which provide links to the surrounding settlements as shown in **Figure 2.2: Environmental Features Plan** and **Figure 2.4: Public Rights of Way** in **Volume 2**. These include the Bernwood Jubilee Way Long Distance Path which runs from north to south in Parcel 2 and the North

Bucks and Midshires Way Long Distance Path which intersects Parcel 3 as outlined in **Figure 2.4: Public Rights of Way** in **Volume 2**.

3. Description of Rosefield Solar Farm

3.1. Introduction

3.1.1. This chapter provides a description of Rosefield Solar Farm for the purposes of identifying and reporting the preliminary likely significant environmental effects during construction, operation (including maintenance) and decommissioning.

3.1.2. The design of Rosefield Solar Farm has evolved (and will continue to evolve) throughout the environmental assessment process to avoid or minimise environmental effects and in response to consultation and engagement feedback, where appropriate. The evolution of the design of Rosefield Solar Farm to date is summarised in **Chapter 4**.

3.1.3. The installation, construction and decommissioning methods to be utilised, will, eventually, be determined by the appointed contractor(s). However, all works will be required to be undertaken within the parameters assessed for Rosefield Solar Farm. With this in mind, this PEIR (and the ultimate ES to be submitted in support of the DCO application) will represent a reasonable 'worst case' scenario, ensuring a robust assessment of the likely significant environmental effects. This chapter details the maximum and, where relevant, minimum parameters of Rosefield Solar Farm which have been assessed to determine the preliminary likely significant environmental effects for the purposes of this PEIR.

3.1.4. The main elements of the Rosefield Solar Farm comprise of the following:

- Solar Photovoltaic (PV) development consisting of:
  - Ground mounted Solar PV generating station. The generating station will include Solar PV modules and Mounting Structures; and
  - Balance of Solar System (BoSS) which comprises: inverters, transformers, switchgear.
- Collector Compounds comprising: switchgear, transformers, ancillary equipment, and operation, maintenance and welfare facilities, and security cabins;
- Battery Energy Storage System (BESS) compound(s) including office/control/welfare buildings, batteries and associated inverters, transformers, switchgear and ancillary equipment and their containers, enclosures, fencing and acoustic fencing, monitoring systems, air conditioning, electrical cables and fire safety infrastructure;
- A project substation ('Rosefield Substation') compound, which is expected to include: transformers, switchgear, busbars, control equipment buildings including office, control functions, material storage, welfare facilities, firewalls, fencing, and a security cabin and parking as well as wider monitoring and maintenance equipment;

- Site-wide operational monitoring and security equipment;
- 400kV Grid Connection Corridor to connect the Rosefield Substation and National Grid East Claydon Substation;
- Cabling to connect the Solar PV modules and the BESS to Collector Compounds, the Collector Compounds to the Rosefield Substation, and the Rosefield Substation to the National Grid East Claydon Substation;
- Ancillary infrastructure works including: boundary treatment, security equipment, lighting, fencing, landscaping, access tracks, works to facilitate vehicular access, earthing devices, earthworks, surface water management, and any other works identified as necessary to enable the development;
- Green Infrastructure, recreation and amenity works including: landscaping, habitat management, biodiversity enhancement and amenity improvements; and
- Highways Infrastructure improvements and safety works including, where possible and necessary, minor junction improvement works, road widening and passing places.

3.1.5. Each of the main elements, outlined above, and their associated features and indicative parameters are explained further below. Each indicative height Above Ground Level (AGL) is reflective of any post-earthwork requirements on Site.

3.2. Project Design Parameters

3.2.1. The design of Rosefield Solar Farm is an iterative process informed by ongoing environmental assessment and consultation and engagement with statutory and non-statutory consultees.

3.2.2. In order to maintain flexibility in the design, it is the Applicant's intention to use the 'Rochdale Envelope' approach within parameter ranges. The Planning Inspectorate's Advice Note Nine 'Rochdale Envelope'[23] provides specific guidance to applicants on the degree of flexibility that could be considered appropriate under the Planning Act 2008 regime.

3.2.3. The Rochdale Envelope is an acknowledged way of dealing with an application comprising EIA development where details of a project have not been fully resolved by the time the application is submitted. The term is used to describe those elements of a scheme that have not yet been finalised, but can be accommodated within certain limits and parameters,

[23] Planning Inspectorate (July 2018). Advice Note Nine: Rochdale Envelope (Version 3). Available online: Advice Note Nine: Rochdale Envelope | National Infrastructure Planning (planninginspectorate.gov.uk)

allowing the likely significant environmental effects of a project to be presented in the ES as a 'worst case'. It also provides the opportunity to assess aspects of a development where the detailed design is to be developed by the Applicant and approved by the determining authority under a DCO Requirement, pursuant to the DCO being made.

3.2.4. Furthermore, such flexibility may be useful where a slight change in the design or capacity of Rosefield Solar Farm is anticipated, but not yet certain. Therefore, it may be possible that a particular element of the design will be subject to on-going technological advancements. It is important that a lack of flexibility in the DCO application does not unduly hinder the Applicant's ability to consider and adopt such future technological advancements. This is of particular importance due to the rapid pace of change in Solar PV and battery storage technologies.

3.2.5. The proposed preliminary parameters for Rosefield Solar Farm, summarised below in **Chapter 3** and illustrated in **Figures 3.1a** to **3.1d**, represent a reasonable 'worst case' scenario for each element of Rosefield Solar Farm. The tables below detail the indicative maximum and, where relevant, minimum parameters for each element of Rosefield Solar Farm. This is to acknowledge the need for the assessment to assess the likely significant environmental effects arising from a 'worst case' scenario.

3.3. Ground mounted Solar PV Generated Station

Solar PV modules

3.3.1. Solar PV modules convert sunlight into electrical current (as Direct Current). Solar PV modules, commonly referred to as solar panels, are made up of individual bifacial PV cells.

3.3.2. The Solar PV modules would contain bifacial cells so that each Solar PV module gains exposure to light both at the back and front. This increases the energy generation.

3.3.3. The Solar PV modules are typically dark blue/black in colour and are held together by a metallic frame, as shown indicatively in **Plate 3.1**. The Solar PV modules would have an anti-reflective coating and would be sloped towards the south.

3.3.4. The Solar PV modules are fixed to a mounting structure which is known as a 'table'. Once the Solar PV modules are electrically connected together in groups they are known as 'strings'. Various factors will help inform the number and arrangement of the Solar PV modules and it is likely some flexibility will be required to accommodate for future technology developments. That notwithstanding, the maximum total extent of Solar PV development will be located within the Fields defined on the **Figure 1.2: Zonal Masterplan**.

3.3.5. The preliminary Solar PV design principles that have been assumed for the purposes of the preliminary assessment are detailed in **Table 3.1**.

Table 3.1 – Preliminary Solar PV parameters

Parameter type	Preliminary Parameters
Indicative maximum height of Solar PV modules	3.5 m except in areas of flood risk which will be 4.5 m AGL.
Indicative minimum height of Solar PV modules	0.8 m AGL. In areas of flood risk, the minimum height will be above the flood level.
Indicative dimensions	Length: 2.5 m. Width: 1.4 m. Depth: 40 mm.
Indicative slope and angle	The Solar PV modules would be sloped towards the south, at a fixed angle of between 10 and 30 degrees from horizontal.
Indicative inter row separation distances	2.5 m.

Mounting structure

3.3.6. The Solar PV modules would be mounted on a metal structure, supported by driven or piled vertical posts, which is known as the 'mounting structure', as shown indicatively in **Plate 3.2**. Ground conditions will determine the appropriate anchoring system and depth of posts.

3.3.7. There is also the potential option for some mounting structures to be supported by concrete footings or shallow tripod footings for example and if required to reduce impacts on areas of archaeological sensitivity.

3.3.8. The mounting structure carrying the Solar PV modules will be designed to face southwards on a fixed platform.

3.3.9. The height for each Solar PV module can be influenced by several design factors including: flood risk, local topography, visual receptors, land use practices, and the Solar PV module type and configuration.

3.3.10. The preliminary mounting structure parameters that have been assumed for the purposes of the preliminary assessment are detailed in **Table 3.2**.

Table 3.2 – Preliminary Mounting structure parameters

Parameter type	Preliminary Parameters
Indicative depth of foundations	2.5 m.
Indicative slope and angle	The mounting structure would be sloped towards the south, at a fixed angle of

between 10 and 30 degrees from horizontal.

Plate 3.1: Example of a Solar PV module and mounting structure

Plate 3.2: Typical mounting structure

3.4. Balance of Solar System (BoSS)

3.4.1. The BoSS refers to the components and equipment required to convert the Direct Current (DC) electricity collected by the Solar PV modules into Alternating Current (AC). The BoSS comprises of inverters, transformers, and switchgear.

3.4.2. This section outlines the two BoSS configuration options available. As Rosefield Solar Farm's design evolves, the configuration of the BoSS will

be refined to reflect consultation responses, a reasonable worst case scenario as part of the ES, and the mitigation hierarchy. The final configuration of the BoSS will be defined post-consent, at the detailed design stage, to take account of any possible technical and technological advancements.

Inverters

3.4.3. Inverters are required to convert the DC electricity (produced by the Solar PV modules) into AC. This allows for the electricity generated by the modules to be exported to the National Grid. Inverters are sized according to the DC output from the Solar PV modules and are typically white or light grey in colour.

3.4.4. Either string or central inverters or a hybrid combination of the two inverter types could be used. String inverters are small enough to be mounted underneath the PV modules, as shown indicatively in **Plate 3.3**. If used, string inverters would be sited at regular intervals amongst the Solar PV modules.

Plate 3.3: Typical string inverter

3.4.5. Alternatively, centralised inverters may be used (as shown indicatively in **Plate 3.4**). Centralised inverters would be grouped together with the transformer and switchgear as part of an outdoor compound or within an ITS container, as part of the Inverter Transformer Station (ITS).

Plate 3.4: Typical outdoor centralised inverter

Transformers

3.4.6. Transformers are required to step up the voltage of the electricity generated by the Solar PV modules and converted by the inverters before it reaches the Rosefield Substation or a Collector Compound. Transformers would be located at regular intervals, within the Solar PV development area, as shown indicatively in **Figure 1.2: Zonal Masterplan**.

3.4.7. Transformers would either be standalone and located within an outdoor compound (adjacent to central inverters and switchgear) or housed within an ITS container.

3.4.8. A typical outdoor transformer is shown indicatively in **Plate 3.5**.

Plate 3.5: Typical outdoor transformer

Switchgears

3.4.9. Switchgears are the combination of electrical switches, fuses or circuit breakers to control, protect and isolate electrical equipment. Switchgears are used to de-energise equipment which allows for maintenance works and fault clearing.

3.4.10. Switchgears can be located within an ITS container or within an outdoor compound (adjacent to the transformers and central inverters). An outdoor switchgear unit is shown indicatively in **Plate 3.6**.

Plate 3.6: Typical outdoor switchgear

Configuration options for BoSS

3.4.11. There are two BoSS options under consideration. Option 1 is for standalone central inverters, transformers and switchgear to be located within the same outdoor compound. Option 2 is for the central inverters, transformers and switchgear to be located within an ITS container.

3.4.12. The co-located and independent inverter, transformer and switchgear option would likely be light grey, white, dark green or similar in colour. Meanwhile, an ITS container would likely be dark green, grey, or similar in colour. Both options would be located within the Solar PV development area, as shown indicatively in **Figure 1.2: Zonal Masterplan**, only where they are outside of Flood Zones 2 and 3.

3.4.13. Further configurability to the above two options is proposed should string inverters be required. The above options would still apply, however the central inverters, as part of the outdoor compound or ITS, would be replaced by string inverters which would be installed underneath Solar PV modules.

Option 1 - Independent outdoor equipment

3.4.14. As shown below in **Plate 3.7**, the central inverter, transformer, and switchgear are located separately within the same outdoor compound. It is

expected that the independent outdoor equipment would sit on compacted hardcore material or concrete pad foundations.

Plate 3.7: Example of independent outdoor equipment

Option 2 - Inverter and Transformer Station (ITS)

3.4.15. As shown indicatively in **Plate 3.8**, the ITS container option houses the inverter, transformer and switchgear together.

3.4.16. The ITS would sit on compacted hardcore material or concrete pad foundations.

Plate 3.8: Typical Inverter Transformer Station

3.4.17. The BoSS location has not been defined at this stage. The final configuration of the BoSS will be defined post-consent, at the detailed design stage. A reasonable worst-case scenario will be assessed and presented in the ES.

3.4.18. For the purposes of the preliminary assessment, it has been assumed that the BoSS equipment would be located independently within the same

outdoor compound and would include central inverters as part of the configuration, unless otherwise outlined for assessment in the environmental factor assessment chapters (**Chapters 6** to **16**).

3.4.19. The preliminary BoSS parameters that have been assumed for the purposes of the preliminary assessment are detailed in **Table 3.3**.

Table 3.3 – Preliminary BoSS parameters

Parameter type	Preliminary Parameters
Indicative dimensions of string inverters	Width: 1.2 m. Depth: 40 mm. Length: 0.9 m.
Indicative dimensions of standalone central inverters	Height AGL: 3.0 m. Width: 3.5 m. Depth: 1.6 m.
Indicative dimensions of standalone transformer stations	Height AGL: 3.0 m. Width: 3.5 m. Depth: 2.0 m.
Indicative dimensions of standalone switchgears	Height AGL: 3.0 m. Width: 2.5 m. Depth: 2.5 m.
Indicative footprint of outdoor transformer, inverter and switchgear compounds	80m2 with a height AGL of 3.5 m.
Indicative dimensions of ITS	Height AGL: 3.0 m. Width: 11.5 m. Depth: 2.5 m.

3.5. Collector Compounds

3.5.1. Rosefield Solar Farm includes a Main Collector Compound which is assumed to be located alongside the BESS compound in Parcel 3, together with two Satellite Collector Compounds with one being located in Parcel 1 and one being located in Parcel 2.

3.5.2. The Satellite Collector Compounds would receive the medium voltage cables from the independent outdoor equipment and/or ITS within the surrounding solar fields. Further cabling would then connect the Satellite Collector Compounds to the Main Collector Compound.

3.5.3. The Main Collector Compound could contain: Security and Welfare Cabins, a Control Building, Switch Rooms, Storage Containers and any other electrical equipment such as static compensation devices and auxiliary transformers.

3.5.4. Each Satellite Collector Compound could contain: Security and Welfare Cabins; a Maintenance building or containers, a single Main and single Auxiliary Transformer, Switch Room and a Control Room.

3.5.5. The colour of the equipment within the Collector Compounds will be either metallic, white, grey, or dark green. Buildings within the Collector Compounds are to be grey or dark green in colour with block and brick elements to be rendered in a sensitive similar colour. All equipment and buildings are to be placed on shallow concrete pad foundations.

3.5.6. The location for the Main and Satellite Collector Compounds will be determined as part of the iterative design process. However, the following fields are being considered for the Main Collector Compound: Fields E20, E21, E22 and E23. One Satellite Collector Compound is being considered in Fields B10 or B23 (south) whilst the second Satellite Collector Compound is being considered in one of Fields D8, D9 or D17, as shown by the Indicative Siting Zones in **Figure 1.2: Zonal Masterplan**. A Collector Compound has been shown indicatively in **Plate 3.9** below.

Plate 3.9: Example of a Collector Compound

3.5.7. The preliminary Collector Compound parameters that have been assumed for the purposes of the preliminary assessment are detailed in **Table 3.4**.

Table 3.4 – Preliminary Collector Compound Parameters

Parameter type	Preliminary Parameters
Main Collector Compound	
Indicative footprint	18,000 m^2 in plan with a height AGL of 6 m.

Indicative number of Switchroom buildings	5.
Indicative switchroom building footprint (within the footprint of the Main Collector Compound)	340 m^2 in plan.
Satellite Collector Compound	
Indicative footprint	2,500 m^2 in plan with a height AGL of 6 m.

3.6. Battery Energy Storage System

3.6.1. The BESS (shown indicatively in **Plate 3.10**) typically comprises a number of container-sized units which house the BESS batteries and associated equipment, BESS Control Containers, Power Conversion System (PCS) and transformers within a BESS Compound.

3.6.2. The final number of BESS containers and transformers will depend upon the most appropriate design power output capacity and duration of energy storage required at the time of construction.

Plate 3.10 Example of a BESS facility

3.6.3. The BESS units each comprise of an enclosure for BESS electro-chemical components and associated equipment including, for example, transformers, inverters, switchgear, power conversion systems, monitoring and control system, Heating, Ventilation and Air Conditioning (HVAC) systems, electrical cables, fire safety equipment, water storage tanks and shut off valves. The need for the above-mentioned associated equipment for BESS units and the BESS Compound more widely will be subject to advancements in BESS technologies and best practice guidance which will be presented in the ES.

3.6.4. AC/DC converters would be used to control the charging and discharging of the BESS to or from the PV generation station and the Grid.

3.6.5. Each BESS container would require a heating, ventilation, and cooling (HVAC) system to ensure that the batteries operate efficiently. A HVAC system may be external to the containerised unit and would either be located within or on top of a BESS container or attached to its side. Should the HVAC system use air, a fan would be built into the system and would be powered by auxiliary power from the Grid.

3.6.6. The BESS containers are modular and, as a result, will be configured to fit the final compound size to respond sensitively to the location of the National Grid East Claydon Substation and any environmental constraints.

3.6.7. The colour of the equipment within the BESS will be either metallic, white, grey, or dark green. Structures and buildings within the BESS are to be grey or dark green in colour with block and brick elements to be rendered in a sensitive similar colour. All equipment, structures and buildings are to be placed on shallow concrete pad foundations.

3.6.8. In addition to the BESS containers, switch rooms, a control room, a staging area, an operation and storage facility, a welfare facility, security and monitoring equipment, security cabin, parking and acoustic fencing and/ or boundary fencing will be located within the BESS Compound. The BESS Compound may also contain water tanks which contain fire fighting water reserves as well as storage tanks for spent fire water. The need for these tanks will be subject to advancements in BESS technologies, best practice and guidance which is to be considered as part of the ES.

3.6.9. The location of the BESS compound has not been fixed, however, the following fields are being considered for siting BESS: Fields D8, D9 and E23, as shown by the Indicative siting zone for BESS within **Figure 1.2: Zonal Masterplan**. It is noted that, although all three fields are identified as being potentially suitable for BESS, the final design may not include BESS on all three fields. For the purposes of the preliminary assessment, the following BESS configurations, in conjunction with the Rosefield Project Substation, have been assessed as part of this PEIR:

- Rosefield Project Substation in Field E11 and BESS units located in Fields D8, D9 and E23.
- Rosefield Project Substation in Field E23 and BESS units located in Fields D8, D9 and E23.

3.6.10. Further detail on the approach the optionality is detailed within **Chapter 5**. The worst-case that has been assessed for each environmental factor is detailed in **Chapters 6** to **17**.

3.6.11. The preliminary BESS parameters that have been assumed for the purposes of the preliminary assessment are detailed in **Table 3.5**.

Table 3.5 – Preliminary BESS Compound parameters

Parameter type	Preliminary Parameters
Indicative footprint of BESS Compound	200,000 m² in plan with a height AGL of 6 m.
Indicative dimensions of BESS Containers and Control Containers	Height AGL: 4.5 m. Width: 3.0 m. Depth: 6.5 m.
Indicative footprint of Switch Rooms	70m2 in plan with a height AGL of 6.0 m.
Indicative footprint of Control Buildings	625m2 in plan with a height AGL of 6.0 m.
Indicative footprint of Staging Areas	1,400m2 in plan.
Indicative footprint of Operation and Storage Facility(ies)	400m2 in plan.
Indicative footprint of Welfare Facility(ies)	400m2 in plan.
Indicative dimensions of Transformers	Height AGL: 2.5 m. Width: 1.5 m. Depth: 1.5 m.

3.7. Rosefield Substation

3.7.1. The Rosefield Substation would facilitate the export and import of electricity to or from the Grid and would consist of electrical infrastructure such as transformers, switchgear and control equipment.

3.7.2. The Rosefield Substation would include one or more buildings which would comprise an office, control functions, material storage, workshop and welfare facilities, a security cabin and parking, as well as operational monitoring and maintenance equipment. Buildings within the Rosefield Substation would be painted black or be made of prefabricated design which would be finished in a sensitive colour to the landscape.

3.7.3. The location of the Rosefield Substation compound has not been fixed but, for the purpose of the preliminary assessment, it has been assumed that the Rosefield Substation could be located within Field E11 or E23 as shown by the indicative siting zone for Rosefield Substation indicated on **Figure 1.2: Zonal Masterplan**.

3.7.4. The preliminary Rosefield Substation parameters that have been assumed for the purposes of the preliminary assessment are detailed in **Table 3.6**.

Table 3.6 – Preliminary Rosefield Substation parameters

Parameter type	Preliminary Parameters
Indicative footprint of Rosefield Substation	54,000 m2 in plan with a height AGL of 15.0 m.
Indicative footprint of Control Building	700 m2 in plan with a height AGL of 6 m.
Indicative number of main transformers	5.
Indicative dimensions of main transformers	Height AGL: 12.5 m. Width: 3.5 m. Depth: 9.0 m.

3.8. Onsite Cabling

Grid Connection Cabling

3.8.1. The electricity generated by the Rosefield Generating Station would be exported via 400kV underground cabling connecting the Rosefield Substation and the National Grid East Claydon Substation.

3.8.2. The total length of the grid connection cabling is still to be determined; however, for the purposes of this PEIR, it is assumed that the cable would be indicatively 1.5 km in length. The cable route will depend on final proposals by National Grid in relation to the connection into the East Claydon Substation which is still being confirmed. For the purposes of this assessment, it has been assumed that the connection point will be to the west of the current National Grid East Claydon Substation. The detail of whether Rosefield Solar Farm or National Grid would be carrying out the works, including those works above ground, to connect the project into National Grid East Claydon Substation has not been confirmed by National Grid at this stage.

3.8.3. The grid connection cabling will seek to avoid constraints such as woodlands and watercourses whilst also minimising, as far as practical, the number of crossings underneath overhead lines. The cabling would also seek to avoid impacts to trees, hedgerows and buried archaeology, as far as practicable.

3.8.4. It is proposed that open-cut trenching methods will be used for the majority of the cable's routing. However, subject to on-going engagement, there may also be a requirement for trenchless techniques such as Horizontal Directional Drilling (HDD). HDD is a suitable technique for crossing roads and avoiding or reducing impacts upon environmental receptors.

3.8.5. Where open-cut trenching methods are used, trenches will be indicatively 2 m wide and 1.5 m deep. Additionally, and depending on the final cable length, jointing bays may be required along the length of the grid

connection cabling. Jointing bays would allow for the connection of lengths of cables and would make maintenance and replacement works easier to undertake, should a fault develop. Jointing bays comprise of a main jointing pit (where the cables are joined) and a smaller link box which provides for connections between the cable screens. A small fibre optic chamber, adjacent to the link box, may also be required if fibre optic communications are necessary.

3.8.6. The jointing bays would be buried underground and would typically be made up of a concrete chamber with a concrete or metal inspection cover.

3.8.7. The jointing bays would be positioned at field boundaries, as far as practicable, to reduce the impact on agricultural activities.

Cabling within and/or between Parcels

3.8.8. Some above ground low voltage electrical cabling is required to:

- Connect the strings of panels; and
- Take account of the extents of the Solar PV development area which are to be located in higher flood risk areas.

3.8.9. This cabling would typically be hung behind the panels or be suspended in a cable tray above ground, for example.

3.8.10. Interrow cables would carry the electricity from the strings of panels to the inverters with onward cabling taking the electricity to the transformers. These cables would be buried underground, except for between Fields at a higher risk to flooding.

3.8.11. Higher voltage underground cables are required between transformers and the switchgear and from the switchgear (housed within Collector Compounds) to the Rosefield Substation and BESS.

3.8.12. The working widths for cable route construction (i.e. underground cables) will be indicatively 50 m. This is to take account for locations where there are a large number of circuit ducts as well as the need to factor in trenches, construction roads and temporary soil storage. Trenches will be indicatively 19 m in width in locations where there is a large number of circuit ducts. Underground cabling is expected to be laid at an indicative depth of 2 m but may be laid deeper were cabling crosses utilities, roads or ditches.

3.8.13. Similarly to the grid connection cabling, open-cut trenching methods will be used for a majority of the cable routing. However, subject to on-going engagement, there may be a requirement for on-ground cabling or trenchless techniques such as Horizontal Directional Drilling (HDD).

3.8.14. Data cables are anticipated to be installed alongside the electrical cables to allow for the monitoring of the infrastructure during the operational phase of Rosefield Solar Farm.

3.8.15. The cabling routes within the Site are subject to an iterative design process informed by ongoing environmental and engineering surveys. **Figure 3.2: Indicative Cable Route** location plan sets out the options currently being considered for these routes. The indicative cabling routes will be further refined, to a corridor(s), which will be presented within the ES.

3.8.16. The preliminary Cabling parameters that have been assumed for the purposes of the preliminary assessment are confirmed in **Table 3.7**.

Table 3.7 – Preliminary Cabling parameters

Parameter type	Preliminary Parameters
Grid Connection Cabling (400kV)	
Indicative length of cabling	1.5 km
Indicative dimensions of cable trenches	Width: 2.0 m Depth: 1.5 m. Except when the cable routes need to cross roads, ditches or known utilities, where depths may be greater.
Indicative construction working widths	25.0 m to allow for trenches, construction roads, soil storage and working areas.
Indicative dimensions of joint bays	Width: 5.5 m. Length: 20.0 m. Depth: 2.5 m.
Indicative separation distances between joint bays	Every 500 m to 800 m of Grid Connection Cabling.
Grid Connection Cabling (400kV)	
Indicative width of cable trenches	19.0 m in some locations across the Site which would be limited to areas where there are large numbers of circuits, typically adjacent to the Rosefield Substation or in main cable corridors between different areas of the Site. Total trench width may be made up of one or more trenches.
Indicative working widths for construction	50 m overall working width to allow for trenches, construction roads, soil storage and working areas.
Indicative depth of cable trenches	2.0 m, except where the cable routes need to cross roads, ditches or known utilities.

3.9. Ancillary infrastructure works

Fencing and Security

3.9.1. The fields housing the Solar PV modules and supporting infrastructure represent the majority share of the land use within Rosefield Solar Farm. These fields would be defined using deer-proof fencing which is formed of wooden and/or metal posts and wire mesh, as shown indicatively in **Plate 3.11** below. It is anticipated that the deer-proof fencing would be an indicative height of 2.5 m.

3.9.2. Deer-proof fencing would run around fields housing the Solar PV modules and would allow for gaps and corridors between fields, thereby retaining permeability for wildlife as is reflected within **Figure 1.2: Zonal Masterplan**.

3.9.3. It is proposed that mammal gates are included within the deer-proof fencing to allow other wildlife to move across the Site. The location of the fencing is to be positioned as close to the infrastructure as possible, whilst allowing for necessary environmental and intra-working offsets.

3.9.4. A minimum 10 m offset from trees and hedgerows that are external to the development area will be provided for to avoid any impacts upon tree root zones and to allow for a biodiversity corridor. A 5 m internal offset from the deer-proof fencing to the Solar PV generating station will be provided for.

3.9.5. Further offsets of 20 m and 30 m will be provisioned for HS2 planting and statutorily and locally designated wildlife sites respectively. The defined location of the fencing will be subject to detailed design.

Plate 3.11: Example Deer proof fencing

3.9.6. Palisade security fencing or monitored pulse fencing and wire mesh fencing would enclose the Rosefield Substation Compound, Rosefield BESS, Collector Compounds and Grid Connection Jointing Bays. The monitored pulse fencing would sit within/behind the mesh fencing.

3.9.7. Palisade fencing is made of steel rails attached to horizontal-running rails, connected to vertical steel joints. Mesh fencing is made of horizontal steel wires which can be interwoven or welded, for example, to vertical steel joints.

3.9.8. It is anticipated that both the palisade fencing and/or mesh fencing would be an indicative 2.75 m in height. The monitored pulse fence would be an indicative 3.4 m in height.

3.9.9. Additionally, pole-mounted closed-circuit television (CCTV) systems are assumed to be positioned around the perimeter of the operational areas of the Site with fixed views into Rosefield Solar Farm as a security measure. It is anticipated that the CCTV systems will be an indicative 5 m in height. CCTV would be positioned within the ground mounted Solar PV Generating Station, BESS compound, Collector Compounds and the Rosefield Substation compound. CCTV lighting will be infrared and not visible.

3.9.10. The preliminary Fencing, Security and Green Infrastructure parameters that have been assumed for the purposes of the preliminary assessment are confirmed in **Table 3.8**.

Table 3.8 – Preliminary Fencing, Security and Green Infrastructure parameters

Parameter type	Preliminary Parameters
Solar Development Fencing	
Indicative height of deer-proof fencing	2.5 m.
Rosefield Solar Farm Fencing and Security	
Indicative height of palisade fencing and/or wire mesh	2.75 m.
Indicative height of monitored pulse fence	3.4 m.
CCTV systems	
Indicative height	5 m.
Green Infrastructure	
Indicative offsets	10 m from all existing hedgerows and trees. 20 m from HS2 planting. 30 m from statutorily and locally designated wildlife sites.

Lighting

3.9.11. The Rosefield Substation compound, BESS compound, and Collector Compounds are assumed to include a combination of sensor operated and manually operated lighting. Manually operated lighting may also be used at gates within the solar fields. No areas of the Site are assumed to be permanently lit.

3.9.12. The lighting design will utilise directional fittings to minimise outward light spill and glare and would only be operated in case of emergency or when needed during maintenance works being undertaken during hours of darkness.

Drainage

3.9.13. The Solar PV modules would not increase the impermeable area and are not anticipated to increase the volume of surface water runoff. The Solar PV modules would be separated by a rainwater gap to allow rainwater to drain feely to the ground between the panels helping to replicate greenfield runoff conditions.

3.9.14. Drainage and sewage systems are likely to be required at the Rosefield Substation compound and BESS compound due to the increase in impermeable hard standing surfaces that form the base of the compounds.

3.9.15. The design of new drainage systems will be based on the Flood Risk Assessment (FRA) and hydrological assessment. The FRA will be submitted in support of the DCO application.

3.9.16. Should the provision of local fire water be required onsite (as is currently required under best practice guidance), a system would be installed to isolate and contain all firewater runoff in the event of an emergency. This would likely include the use of a system which can stop surface water discharge offsite through the onsite drainage network. The potentially contaminated runoff would then be contained within a storage tank prior to being collected and tankered off-Site to be suitably tested and disposed.

Internal Site access tracks

3.9.17. The required access tracks across the Site would follow the alignment of existing agricultural tracks, where possible. The access tracks would typically be constructed of permeable materials such as gravel, would have a running width of approximately 6 m and would be permanent to facilitate operational maintenance of Rosefield Solar Farm.

3.10. Green Infrastructure

Recreation and amenity improvements

3.10.1. Improvements will be designed to retain and enhance recreational connectivity across the Site across the construction, operation and decommissioning phases of Rosefield Solar Farm which, in turn, will lead to amenity improvements.

3.10.2. Based on feedback from non-statutory consultation, and to enhance the connectivity in the local area, Rosefield Solar Farm is proposing a new permissive path within the Site as well as two diversions to existing footpaths to rationalise and improve the network, as detailed below:

- A diversion to the existing PRoW Footpath (reference 'SCL/13/1') to the west of Parcel 1 to rationalise the existing route together with PRoW footpath 'SCL/13/2' which would provide improved connections to other existing rights on way in the area.
- A diversion to the existing PRoW Footpath (reference 'ECL/4/2') to the north of Parcel 3 to reroute the Footpath around fence lines, rather than through the Fields.
- Proposed new permissive path through Parcel 1, connecting to the existing PRoW Footpath (reference 'MCL/14/1'), running south to the east of Shrubs Wood, east across Knowl Hill (Field B17) and then running north along the alignment of Three Points Lane.

3.10.3. The diversions to PRoW Footpaths 'SCL/13/1' and 'ECL/4/2' would be undertaken and completed during the construction phase of Rosefield Solar Farm. These diversions are then anticipated to become permanent and would therefore be in place through the operational and decommissioning phases of Rosefield Solar Farm.

3.10.4. The possible new permissive path would be tied to Rosefield Solar Farm. It is anticipated that the new permissive path would be implemented during the construction phase, remain open and accessible during the operational phase and be removed upon the decommissioning of Rosefield Solar Farm.

3.10.5. The Rights of Way improvements and new permissive path proposals are illustrated in **Figures 3.3a to 3.3d: Indicative Green Infrastructure Parameters Plans** in **Volume 2**.

Landscape, Habitat and Biodiversity Enhancement

3.10.6. Rosefield Solar Farm will include landscaping, habitat management and biodiversity enhancements, designed to retain and improve ecological and recreational connectivity. **Figure 3.4: Landscape and Ecological**

Mitigation and Enhancements Plan in **Volume 2** sets these out for Rosefield Solar Farm.

3.10.7. Rosefield Solar Farm has been designed to ensure that existing woodlands will be retained. Whilst efforts have been and will continue to be made to ensure existing hedgerows, individual trees and field margins are retained as far as practical, some minor removals may be necessary for the provision of access, visibility at turning and the installation of cabling. The use of existing agricultural tracks, where practically possible, is anticipated to minimise the number and width of any hedgerow loss.

3.10.8. Landscaping, including but not limited to new hedgerow and tree planting, is proposed to avoid and/or minimise significant environmental effects.

3.10.9. The planting type would be resilient to climate change and comprise of majority native (and of local provenance) species that contribute towards biodiversity enhancement.

3.11. Construction Phase

Indicative construction programme

3.11.1. The bulk of the construction works is anticipated to last up to 30 months and is assumed to commence no earlier than Q2 2028. The construction period would be followed by a six-month commissioning period, which will include Site restoration, landscaping and connecting the Rosefield Solar Farm to the Grid.

Construction activities

3.11.2. The main construction works and activities to build Rosefield Solar Farm will include:

- Offsite highway works (if required);
- Formation of Site entrances, internal roads and construction compounds;
- Internal roads construction and installation of main cables in trenches;
- Installation of PV module frames, PV modules, ITS, cabling, roads and fencing within each PV field;
- Installation of Rosefield Substation, Collector Compounds and BESS foundations, equipment, buildings, and cabling;
- Installation of 400kV cabling to connect to National Grid East Claydon Substation; and,
- Testing and commissioning.

3.11.3. Depending on the construction approach adopted, the above tasks may overlap or run in parallel.

Testing and commissioning

3.11.4. Following the installation of Rosefield Solar Farm, the main elements would be required to undergo a stage of testing before the electricity can be generated and supplied to the National Grid network. This stage is anticipated to take between six and eight months. This is to allow for the testing of individual components, such as Rosefield Substation, Collector Compounds and the BESS. Once the testing and commissioning phase is complete, Rosefield Solar Farm would be able to enter into its operational phase.

Construction Access

3.11.5. Three construction access points to the Site are proposed, as shown on **Figure 3.5: Indicative Construction and Operational Access and Movement Parameters** in **Volume 2** and as set out below:

- The main construction access would be off Claydon Road serving Parcels 1, 1a and 2.
- A second access would be off Quainton Road to the north of Parcel 2. This would provide connections between Parcels 1, 1a and 2 and Parcel 3.
- The third access would be off Granborough Road, providing access to Parcel 3. Granborough Road may be subject to widening or layby works to assist with construction traffic management.

3.11.6. An additional access on East Claydon Road would be exclusively available for a small number of Abnormal Indivisible Load (AIL) deliveries (being loads which are larger than regular HGVs) during construction., This access will be via Winslow, making use of National Highways' preferred routes for high and heavy abnormal load movements. All other construction traffic would be routed from the south.

3.11.7. The final location of the construction accesses will be determined by technical surveys, ongoing engagement with the Highways Authority, following the development of the arrangement and layout of Rosefield Solar Farm. The final proposed access points will be detailed and assessed within the ES.

3.11.8. The construction access strategy is being developed in coordination with the environmental inputs, engagement with National Highways and the Highways Authorities. However, only one access route is being considered as a preferred option. This access route makes use of the A41 to Claydon Road via Fidlers Field/Snake Lane and avoids construction traffic passing through villages and towns in the surrounding area.

3.11.9. The Site access points and road crossing options to Parcels 1, 1a, 2 and 3 have been identified in **Figures 3.5a to 3.5d** in **Volume 2**.

3.11.10. Temporary access tracks would be provided to link the temporary construction compounds to the Site access points. With internal access tracks following existing agricultural tracks, soil disturbances, tree and hedge removal would be kept to a minimum. Internal access tracks would be constructed of stone laid on a geotextile membrane, with any required excavation kept to a minimum.

Enabling works for access to Site

3.11.11. The extent of highway improvement works will be determined following the completion of the visibility assessments and swept path analysis. Initial swept path analysis has been completed for the preferred field access locations. Improvements to field access has been identified and included in the development of the design. Any areas requiring highway accesses or improvements will be detailed within the ES.

Abnormal/large load deliveries

3.11.12. Vehicles transporting Abnormal Indivisible Loads (AIL) are anticipated to visit Site up to 10 times during the construction phase. AIL loads are larger than that of an HGV.

3.11.13. As described above, the movement of abnormal loads will be routed via Winslow, with construction access for these loads only to be taken from East Claydon Road.

3.11.14. The swept path analysis will be updated following the confirmation of specific plant requirements during the development of the design.

Construction traffic management

3.11.15. Measures to control the delivery of materials and staff onto the Site during the construction phase will be documented within and secured by the Outline Construction Traffic Management Plan (CTMP), (a draft is provided in **Appendix 14.2** in **Volume 3** of this PEIR). The Outline CTMP will be submitted in support of the DCO application and will include the following details:

- Access and parking arrangements for Site personnel, contractors and visitor arrangements for delivery and removal of materials;
- Arrangements for loading, unloading and storage of plant and materials;
- A scheme for routing and control of traffic associated with the construction and temporary signage during the construction phase;
- Implementation programme including the proposed construction period and hours of operation; and

- Details of any additional management measures, including details of wheel washing facilities and condition surveys.

Temporary construction compounds

3.11.16. Temporary compounds would be required and established before commencement of the main construction works.

3.11.17. Compounds would principally be used for the storage of materials, plant and equipment. The temporary compounds would include hardstanding areas, with haul road areas comprising stone laid on a geotextile membrane. The construction compounds would also include manually operated lighting systems to ensure safety and security, especially in the winter months.

3.11.18. It is anticipated that there will be three Main Construction Compounds with one being located within each of Parcels 1, 2 and 3. Each Main Compound would be approximately 25,000 m^2 in plan.

3.11.19. It is also anticipated that there would be a total of three Satellite Construction Compounds with one compound being located within each of Parcels 1, 2 and 3. Each Satellite Compound would be approximately 1,250 m^2 in plan.

3.11.20. Main Construction Compounds would typically include a staff office, welfare facilities, security gatehouse, waste, material, plant and machinery storage, plant parking, panel testing facilities, drainage, fencing and CCTV. Satellite Construction Compounds would typically include security and welfare facilities (to a lesser extent than the Main Construction Compounds) but would mainly be used for the storage of bulk materials relating to construction.

3.11.21. The areas being considered for Main and Satellite Construction Compounds are shown by the Indicative siting zones on **Figure 3.6: Indicative location suitable for the Main and Satellite Construction Compounds** in **Volume 2**.

3.11.22. There may also be a requirement to utilise temporary laydown areas (for the storage of materials) across the Site as needed.

Construction environmental management

3.11.23. Key measures to control and minimise impacts on the environment during construction will be documented within and secured by the Outline Construction Environmental Management Plan (CEMP), submitted as part of the DCO application.

3.11.24. The purpose of the CEMP is:

- To ensure that impact and nuisance levels as a result of construction activities are kept to a minimum;
- To comply with relevant regulatory requirements and environmental commitments; and
- To ensure procedures are put into place to minimise environmental effects during construction.

Public Rights of Way (PRoWs)

3.11.25. PRoWs would be kept open during construction as far as it is practicable and safe to do so. Where it is not practicable and safe, some PRoWs may need to be temporarily closed or, in the anticipated case for PRoW Footpaths 'SCL/13/1' and 'ECL/4/2', diverted.

3.11.26. The temporary closure of PRoWs will be avoided, and diversions will be provided, where possible. If a diversion is required, it would be designed to provide a safe alternative route which would be discussed and agreed with the County PRoW Officer.

3.11.27. The Public Rights of Way Management Plan (which is to be submitted alongside the DCO application) will include a schedule of PRoWs within the Site boundary and outline the proposed measures to manage any requirements to temporarily close or divert PRoWs within the Site boundary during construction.

Water management

3.11.28. It is anticipated that potable drinking water (for the purposes of the construction welfare facilities) would be delivered to Site by bowser, where required, or provided by a mains water supply. Raw water for the construction phase is expected to be brought to Site by bowser or be provided from an existing private irrigation network or using mains water supplies. However, the exact approach is to be determined and agreed with the relevant consultees. In any case, a reasonable worst-case scenario has been assessed for the purposes of the preliminary assessment.

Construction waste

3.11.29. Rosefield Solar Farm is anticipated to generate construction waste. The bulk of this waste will likely be made up of recyclable wooden pallets and cardboard. A small number of waste PV modules are anticipated as modules may be damaged during delivery or installation. A small amount of cabling waste is also anticipated from the installation of PV cables. More general waste is anticipated from the construction worker welfare facilities.

3.11.30. Measures to manage construction waste will be documented within and secured by the Outline Site Waste Management Plan and the Outline Construction Environmental Management Plan. The contactor would be required to manage these documents and the waste arising from the construction phase through the implementation of the waste hierarchy[24]. This is to ensure that construction waste is recycled and reused as far as practically possible.

3.11.31. Waste skips would be used to contain and remove waste during the construction period. It is anticipated that there would be approximately 5-10 waste skips per week on average for the duration of the 30-month construction period.

3.11.32. All waste removal would be undertaken by fully licenced waste carriers and licenced waste facilities.

Soil Management

3.11.33. It is anticipated that any topsoil that is stripped for the purposes of provisioning access tracks, the cable trenching works or construction compounds would be stored temporarily within areas adjacent to the cable route or within the temporary construction compounds. The soil would be used to backfill the cable trenches and reinstate any temporary construction compounds and temporary access tracks used for the construction phase.

3.11.34. Measures for soil management, following the principles of best practice to maintain the physical properties of the soil, will be documented within and secured by the Outline Soil Management Plan. The Management Plan aims to secure the restoration of the land to its pre-construction condition following the temporary construction use.

Staff and working hours

3.11.35. It is assumed that approximately 30 staff per compound would be onsite for the initial Site set-up which includes the forming of the access points and preparation of the ground. Shortly after this time, staff numbers would increase once the compounds are set up and construction of the access tracks within each Parcel begins. It is anticipated that staff numbers would increase further to a maximum of 600 workers during the peak construction period.

3.11.36. It is anticipated that the working hours on Site would be from 7am until 7pm Monday to Friday and typically 7am – 12 noon on Saturday. No work

[24] European Union's Waste Framework Directive (WFD Directive 2008/98/EC)

will be undertaken on Sundays or Bank Holidays without the prior arrangement/agreement with Buckinghamshire Council.

3.12. Operation Phase (including maintenance)

3.12.1. Rosefield Solar Farm would be operational for a period of up to 40 years. However, this will depend on the operational capability of Rosefield Solar Farm as a result of its maintenance regime as is the case with any generating asset.

Operational activities

3.12.2. The main activities during the operational phase of the Rosefield Solar Farm will principally relate to maintenance works, as and when they are appropriate. It is anticipated that routine inspections would be carried out with access being taken from the construction roads. Maintenance activities are likely to include:

- Regular visual inspection of all infrastructure;
- Regular scheduled inspections and testing of equipment;
- Repair, adjustment, alteration, refurbishment or like-for-like replacement of consumable items;
- Cleaning of Solar PV modules, if required;
- Repair, adjustment, alteration, refurbishment or replacement of panels or other components. The aim being to improve the infrastructure's operational capability or repair any defaults;
- Removal of infrastructure, where replaced;
- Delivery of spare parts, replacement equipment items and consumables;
- Water management (e.g. clearing of drainage ditches); and
- Vegetation management (e.g. cutting grass or trimming hedges and trees).

Operational Site access

3.12.3. Access to Rosefield Solar Farm would be taken from two principal access junctions as shown on **Figure 3.5 Indicative Construction and Operational Access and Movement Parameters** in **Volume 2** and as set out below:

- Parcels 1, 1a and 2: Access to the solar arrays would be taken from a new priority junction location on Claydon Road. This would provide access to the whole Site to the west of Claydon Road; and,
- Parcel 3: Access would be taken via a new priority junction on Granborough Road.

3.12.4. Internal Site access tracks, established during construction, would be used where possible to cross the Site.

Environmental management

3.12.5. An Outline Operational Environmental Management Plan (OEMP), which will be submitted in support of the DCO application, will document and secure the principles and key measures which are to be employed during the operational phase. The OEMP will control and minimise the impacts of operational activities on the environment and will be submitted in support of the DCO application.

3.12.6. For example, any equipment that is damaged or requires replacement during the operational phase will be disposed of following the waste hierarchy, with materials being reused or recycled wherever possible. Any electrical waste will be disposed of in accordance with the Waste from Electrical and Electronic Equipment (WEEE) Regulations[25].

Environmental enhancement

3.12.7. During operation a programme of landscape and ecology establishment would be carried out. This programme would be documented within and secured by the Outline Landscape and Ecological Management Plan (LEMP) which will be submitted in support of the DCO application. This LEMP would secure the delivery of Biodiversity Net Gain through planting. The Indicative Landscape and Ecological Mitigation and Enhancements Plan sets out the current proposals for environmental enhancements.

Battery safety

3.12.8. A management plan for battery safety will be prepared and submitted together with the DCO application in the form of an Outline Battery Safety Management Plan (BSMP). This plan will be developed with ongoing inputs and consultation with the Buckinghamshire Fire and Rescue Service.

3.12.9. The outline plan submitted together with the DCO application will form the basis for the preparation of a fully detailed BSMP at a later stage. The purpose of the outline plan will be to ensure the safe operation of the BESS and will set out the parameters for the management of fire risk associated with the BESS. The likely key principles with respect to the approach to risk mitigation, as will be contained within the submitted BSMP, are as follows:

[25] Waste Electrical and Electronic Equipment (WEEE) Regulations (2018). Available online: Regulations: Waste Electrical and Electronic Equipment (WEEE) - GOV.UK (www.gov.uk)

- BESS procurement and testing requirements which Rosefield will require any BESS provider to comply with;
- Established design requirements of the BESS design and construction to reflect key international standards and best BESS practice;
- Established key safety requirements for the safe operation and decommissioning of the BESS to reflect key international standards, national BESS guidance best BESS practice (for example, the Health and safety in grid scale electrical energy storage systems Guidance[26]);
- Information and training for end users; and
- Risk mitigation and control measures including cell manufacturing, transport, installation and decommissioning, fire compartmentation and fire service accessibility, fire detection, fire suppression, ventilation, cooling and heating and drainage.

Public Rights of Way

3.12.10. A Public Rights of Way Management Plan will document and secure the management of PRoWs. It is anticipated that operational and maintenance vehicles may cross PRoWs during visits to the Site on an infrequent basis. The Management Plan will ensure that should there be damage to the surface of a PRoW, the surface will be repaired as soon as practical and returned to its previous condition. In terms of the vegetation growth along PRoWs, the final Landscape and Ecological Management Plan will document and secure the regular cutting back of vegetation to ensure PRoWs remain clear for passage.

Water and waste management

3.12.11. It is anticipated that potable drinking water for the purposes of the operational facilities would be delivered to Site by bowser or provided by a mains water supply.

3.12.12. Raw water for the wider operational activities is expected to be brought to Site by bowser or may be provided from an existing private irrigation network or using mains water supplies. The exact approach is to be determined and agreed with the relevant consultees. A reasonable worst-case scenario has been assessed for the purposes of the preliminary assessment.

3.12.13. Effluent from the operational substation facilities is anticipated to be routed to septic tanks which will in turn feed into a filtration system which could be

[26] Health and safety in grid scale electrical energy storage systems (accessible webpage. (2024). Available online: Health and safety in grid scale electrical energy storage systems (accessible webpage) - GOV.UK (www.gov.uk)

discharged to watercourses. This is to be determined following the detailed Surface Water Drainage Strategy and agreed with the relevant consultees.

Staff and working hours

3.12.14. It is anticipated that there would typically be up to 10 permanent operating and security staff will be based at the Rosefield Substation and BESS compound facilities, with the potential for additional staff attending the facility during repowering activities, specialist maintenance activities or Site visits.

3.12.15. In the event that there may be a requirement to replace faulty or degraded equipment, there may be a small number of HGV movements. Such movements are anticipated to be low in frequency and on an ad hoc basis.

3.12.16. Working hours during operation would be similar to those during the construction stage. It is anticipated that the working hours on-Site would be from 7am until 7pm Monday to Friday and typically 7am – 12 noon on Saturday. No routine operation and maintenance work will be undertaken on Sundays or Bank Holidays.

Management plans

3.12.17. A number of outline management plans would be submitted as part of the DCO application. **Table 3.9** below sets out the management plans that are currently proposed to be submitted, and the phases of development that these management plans will be used for.

Table 3.9 – Management Plans to be submitted

Management plan to be submitted	Relevant Phase of Development
Outline Construction Environmental Management Plan (which will include an Outline Materials Management Plan as an appendix)	Construction
Outline Operational Environmental Management Plan	Operation
Outline Decommissioning Environmental Management Plan	Decommissioning
Outline Landscape and Ecological Management Plan	Construction and Operation
Outline Site Waste Management Plan	Construction
Outline Soils Management Plan	Construction, Operation and Decommissioning

Management plan to be submitted	Relevant Phase of Development
Outline Construction Traffic Management Plan (which will include an Outline Travel Plan as an appendix)	Construction
Outline Public Rights of Way Management Plan	Construction, Operation and Decommissioning
Outline Battery Safety Management Plan	Operation

3.13. Decommissioning Activities

3.13.1. Decommissioning activities and works would generally mirror the construction phase but in reverse. As such, the main activities would include:

- Removal of all above ground infrastructure (i.e., Solar PV infrastructure, Ground Mounted Solar PV Generating Stations, Collector Compounds, Rosefield Substation, BESS and ancillary infrastructure including any onsite compounds);
- Removal of all concrete, hardstanding areas, foundations for the infrastructure, buried cables, and any internal tracks cut to a depth of up to 1 m; and
- Site reinstatement works to return the land within the Site back to the landowners so that it can be put back into agricultural use. Site reinstatement includes the removal of the two permissive paths implemented during the construction of Rosefield Solar Farm. Only those areas of established hedgerows and woodland would be left in situ.

Environmental management

3.13.2. In recognising that, at the time of decommissioning, the regulatory framework, good industry practices and the future baseline could have altered, the Applicant will develop and implement a Decommissioning Environmental Management Plan (DEMP). The DEMP will take account of good industry practice, obligations to landowners under the relevant agreements, all relevant statutory requirements and the management of decommissioning traffic, waste, and biodiversity conditions.

3.13.3. An Outline DEMP will be submitted in support of the DCO application, which will be secured by a DCO requirement.

3.13.4. The decommissioned infrastructure and materials will follow the waste hierarchy so that they would be reused, where possible, before being recycled or, lastly, disposed of where absolutely necessary.

3.13.5. For example, the Solar PV modules are made up of several materials including a metal frame of which approximately 99% can currently be recycled. Options to re-use or recycle infrastructure and materials will be explored to ensure as much of the infrastructure and materials as possible is recycled and diverted from landfill.

3.14. Good design and Project Principles

3.14.1. Design should be considered as a process and an outcome, and the importance of good design for NSIPs is championed in National Policy, including NPS EN-1 and NPS EN-3 which set out criteria for achieving good design. Supporting consideration of good design for infrastructure projects, and referred to in the NPS EN-1, the National Infrastructure Commission's (NIC) 'Design Principles for National Infrastructure' identified the purposes of the design process is to bring together engineering, environmental and creative expertise to shape and deliver a development project. The document notes that "design is as much about process as it is product. Imaginative thinking about design should be embedded at every step of planning and delivery. The principles ensure a good process leads to a good design outcome."

3.14.2. The thematic principles identified in the NIC 'Design Principles for National Infrastructure' have informed the wider Project Objectives for Rosefield Solar Farm under which the project principles have been developed. These are:

- Climate (Mitigate greenhouse gas emissions and adapt climate change) - Make efficient use of our land to increase the supply of clean, secure and affordable energy in the UK.
- People (Reflect what society wants and share benefits widely) - Be a good neighbour by respecting others, working considerately and recognising our place within the community.
- Places (Provide a sense of identity and improve our environment) - Design a layout that responds to the distinctive character of the local environment and creates opportunities to deliver recreational, landscape and ecological enhancements.
- Value (Achieve multiple benefits and solve problems well) - Work closely with the communities in which the project is located to ensure that benefits are shared locally.

3.14.3. Good design has been a fundamental consideration from the outset. The following strategic principles, shown within **Table 3.10**, have been identified to ensure good design outcomes are embedded within Rosefield Solar Farm from the very start.

Table 3.10 – Strategic principles

Strategic principles	Project principles	Design principles
Build resilience in a changing climate	Design for resilience and adaptation to future climate change.	Structural planting is to consist of native and indigenous species and wherever possible from local provenance.
Design places that support and enhance local communities	Engage openly, transparently and meaningfully with stakeholders taking their feedback into account and making use of local knowledge to improve Rosefield Solar Farm throughout the design process. Consider the amenity of Botolph Claydon and individual homes and properties with appropriate setbacks and buffers and planting proposals assessed on a case by case basis. Consider sequential views and the experience of people using the local network of Public Rights of Way and recreational routes, Calvert Road, Claydon Road and other local roads. Work with the Claydon Estate to secure the long-term management of both the agricultural landscape and mitigation/enhancements provided by the scheme. Identify opportunities for wider community benefits in consultation with local stakeholders.	There will be a minimum 250 m offset from the fence line around ITS, BESS, Project Substations and Collector Compounds to residential properties, determined on a case by case basis responding to noise modelling and residential visual amenity assessments. Offsets from the fence line around the Solar PV development to residential properties will be determined on a case by case basis responding to noise modelling and residential visual amenity assessments.
Ensure responsible construction, ongoing maintenance and decommissioning	Access for construction works will be located to limit disruption to the local community, including avoiding construction traffic passing through surrounding	EDF Renewables continuing ask all suppliers to ensure compliance with the Modern Slavery Act.

Strategic principles	Project principles	Design principles
	villages such as Botolph Claydon, East Claydon, Steeple Claydon, Granborough, Quainton and Calvert Behave as a considerate neighbour through both construction and operation. Provide clear lines of communication between the developer and the local community. Prioritise sustainable resource management and techniques and minimise carbon emissions throughout the project lifecycle, applying the highest possible levels of transparency and sustainability throughout the supply chain. Opposing the abuse of human rights and forced labour anywhere in the global supply chain and ensuring compliance of all suppliers with the Modern Slavery Act.	EDF Renewables actively strengthening existing procurement process to make every effort to prevent any negative impact on people and the environment. EDF Renewables applying the highest possible levels of transparency and sustainability throughout the value chain and commit to the development of an industry-led traceability protocol to help ensure our supply chain is free of human rights abuses. EDF Renewables undertaking regular compliance reviews and audits of our suppliers, which involves visiting their factories.
Improve economic resilience through education and by boosting the UK supply chain	Foster innovation and extend supply chain to leave a lasting legacy value for Buckinghamshire and the UK. Provide education and interpretation of the solar farm and the historic and biodiversity features of the Site.	All members of the supply chain will provide a carbon reduction plan. All suppliers will meet EDF Renewables' tendering, procurement and supply chain requirements. Hold a supplier event in Buckinghamshire for potential contractors to meet EDF-R construction and procurement team. Explore working with local schools/colleges

Strategic principles	Project principles	Design principles
		to develop skills needed for solar industry (e.g. join career fairs, sponsor/facilitate courses for construction and engineering skills that are needed by the solar industry). Offer visits/tours of the site to schools/colleges once operational. Incorporate interpretation panels within the design, explaining renewables, the historic environment and biodiversity of the site and context.
Increase biodiversity appropriate to the landscape character and connect nature	Retain, wherever reasonably possible, existing landscape features such as hedgerows, trees, woodlands, ditches, ponds and watercourses with appropriate buffers from solar development. Manage existing habitats identified through habitat surveys to increase their value for wildlife. Create new habitats to support key species such as Bechstein's bats and black hairstreak butterfly. Respect and where possible create and enhance habitats adjacent to the mitigation works undertaken in relation to HS2. Use locally native species wherever possible to create new habitats, increase the number of pollinator species	Exceed 10% Biodiversity Net Gain on site. There will be a minimum 30m offset from all fence lines within Rosefield Solar Farm to statutorily and locally designated wildlife sites. There will be a minimum 320m offset from all fence lines within Rosefield Solar Farm to Ancient Woodland. There will be a minimum 10m offset from all fence lines within Rosefield Solar Farm to all existing hedgerows. There will be a minimum 50m offset from all fence lines

Strategic principles	Project principles	Design principles
	and create food sources for birds during winter months. Use land under and between solar panels to improve soil health and deliver biodiversity benefit for pollinators and farmland birds. Deliver a substantial biodiversity net gain beyond the minimum of 10%.	within Rosefield Solar Farm to main [redacted] Proposed hedgerows will be planted with a variety of fruiting and nut bearing species providing foraging opportunities.
Lead with the landscape	Ensure proposals fit with the natural environment and draw from existing characteristics, informed by relevant local studies such as the Aylesbury Vale Landscape Character Assessment. Within parts of the Site that fall within the Quainton - Wing Hills Area of Attractive Landscape (AAL), give careful consideration to the location of any development and respecting the Special Qualities of the designation e.g. enhancing field boundaries and retaining key views towards the AAL. Respect the historic pattern of the landscape and setting of cultural sites, including Claydon House and individual Listed Buildings, responding to the distinctive character of the local environment. Conserve and where possible enhance designed landscape features such as Home Wood and Knowl Hill, and give consideration to providing greater access to enable their appreciation. Retain existing vegetation wherever reasonably possible to maintain the fabric of the	Boundary fencing will not be constructed through existing hedgerows or across ditches. There will be a minimum 30m offset from all fence lines within Rosefield Solar Farm to existing Ancient Woodlands. There will be a minimum 20m offset from all fence lines within Rosefield Solar Farm to existing woodlands. There will be a minimum 10m offset from all fence lines within Rosefield Solar Farm to all existing hedgerows.

Strategic principles	Project principles	Design principles
	site and aid assimilation of development into its context.	
Make efficient use of the land, touch it lightly	Optimise generation and export capacity of the solar farm within the constraints of the site to make the most efficient use of the land and available grid connection. Internal access tracks and cable routes will use existing tracks, hedgerow and watercourse crossings and / or gaps in the hedgerows wherever practical. The grid connection route should comprise below ground cables where possible, with surface mounted cable trays to be utilised within areas of archaeological sensitivity. The use of overhead lines will be avoided. Cabling routes will run alongside access tracks as much as possible to avoid wider excavations. Fences will be designed to integrate with the local environment, allow for the movement of wildlife (e.g. through the use of mammal gates) and meet the functional requirements of the project. Minimise the use of concrete, trenches and foundations. Cabling to be predominantly subsurface. However within areas of archaeological sensitivity above ground options will be sought to mitigate potential impacts on archaeological assets below ground.	Internal access tracks and cable routes will use existing tracks, hedgerow crossings and / or gaps in the hedgerows wherever possible. Grid connection route should comprise below ground cables where possible, with surface mounted cable trays to be utilised within areas of archaeological sensitivity. The use of overhead lines will be avoided. Cabling routes will run alongside access tracks as much as possible to avoid wider excavations. The use of concrete will be minimised. The use of trenches and foundations will be minimised. Utilise easily removable foundations wherever possible. Produce outline Landscape and Ecology Management Plan and Decommissioning Environmental Management Plans as part of the DCO Application

Strategic principles	Project principles	Design principles
Manage water, improve quality, reduce pollution	Improve water quality, through taking land out of intensive agricultural use to prevent fertilisers and herbicides leaching into watercourses and improving habitats along the margins of watercourses to provide semi-natural buffers, and flood resilience through slowing the flow of water within the site and along Claydon Brook, where possible, through use of measures such as attenuation basins where appropriate. Apart from Solar PV modules, no built structures (central inverters, substation and BESS) will be located within Flood zones 2 or 3. Solar PV modules will be above the maximum flood height level.	Minimum offset of least 10 m either side of Main Rivers, and 6 m from ditches and ordinary watercourses, to all fence lines within Rosefield Solar Farm. Where crossing points are required over Main Rivers or ordinary watercourses, these will be designed to minimise effects on floodplain and any biodiversity interest associated with the watercourse.
Provide new ways to enjoy the countryside that go beyond the lifetime of the scheme	Safeguard existing amenity, improve access and seek new opportunities for recreation, for walkers, cyclists and horse riders. Retain existing Public Rights of Way and recreational routes within the Site where practically possible. Landscape and ecological mitigation and enhancements will be provided and routes will be maintained to ensure they remain passable/ unobstructed for the lifetime of the project. Protect the amenity of the Bernwood Jubilee Way and North Bucks and Midshires Way, retaining views towards the Quainton Hills where reasonably possible.	Provide new ways to enjoy the countryside that go beyond the lifetime of the scheme

Strategic principles	Project principles	Design principles
	Consideration will be given to the creation of additional routes to provide inclusive access to new locations around the Site, connecting to the existing network of promoted walks, cycleways and bridleways.	
Support agricultural productivity	Avoid development within fields comprising majority Grade 2 or 3a agricultural land where possible.	Support agricultural productivity

4. Reasonable Alternatives Considered

4.1. Introduction

4.1.1. This chapter provides a summary of the reasonable alternative options that have been considered by the Applicant for Rosefield Solar Farm to date, including the initial selection of the Site and through the development of the design.

4.1.2. This chapter also details how the assessment of sites and design alternatives has been undertaken, the factors that have been considered and the main reasons for discounting alternative design options.

4.1.3. The following alternatives have been considered during the design evolution process to date:

- Alternative sites;
- Alternative renewable technologies;
- Alternative solar technologies; and,
- Alternative layouts including for the Solar PV development, Battery Energy Storage System (BESS), Substation and associated cable routes.

4.1.4. The Planning Inspectorate's Advice Note 7 sets out that a good Environmental Statement (ES) is one that amongst numerous things: "***explains the reasonable alternatives considered and the reasons for the chosen option taking into account the effects of the Proposed Development on the environment***".

4.1.5. National Planning Statement (NPS) EN-1 paragraph 4.3.9 confirms that from a policy perspective, there is no general requirement to consider alternatives or to establish whether a development represents the best option.

4.1.6. However, paragraphs 4.3.15 to 4.3.17 of NPS EN-1 go on to set out the circumstances where there is a requirement to consider alternatives, as noted:

- Applicants are obliged to include in their ES, information about the reasonable alternatives they have studied. This should include an indication of the main reasons for the Applicant's choice, taking into account the environmental, social and economic effects and including, where relevant, technical and commercial feasibility;
- In some circumstances the NPSs may impose a policy requirement to consider alternatives; and,

- Where there is a policy or legal requirement to consider alternatives, the Applicant should describe the alternatives considered in compliance with these requirements.

4.1.7. Regulation 14(2)(d) of the EIA Regulations requires "***a description of the reasonable alternatives studied by the applicant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment***" to be presented in the ES. A description of the alternatives considered to date is therefore presented in this Preliminary Environmental Information Report (PEIR) and a full description of the alternatives will be provided in the ES.

4.2. Alternatives considered

Alternative sites

4.2.1. Before setting out Rosefield Solar Farm's site selection process, it is important to note that the Applicant's central objective was to identify a suitable site which could deliver an Nationally Significant Infrastructure Project (NSIP)-scale project, while meeting the Project Objectives set out in **Chapter 3: Description of Rosefield Solar Farm** of this PEIR.

4.2.2. The Applicant did not consider sites which could deliver smaller scale projects on the basis of the urgent need to deliver as much solar as possible to meet the UK Government's target of up to 70 GW by 2035, as set out within NPS EN-3 and the British Energy Security Strategy. Given the limited availability of connections into the National Electricity Transmission System (NETS) (which are required for utility-scale solar), it is important that any connection is used as efficiently as possible. This approach is supported in the NPS EN-1 paragraph 4.3.22 which states that only alternatives that can meet the same objective as Rosefield Solar Farm need to be considered. Additionally, NPS EN-1 paragraph 4.3.23 states that "***the Secretary of State should be guided in considering alternative proposals by whether there is a realistic prospect of the alternative delivering the same infrastructure capacity (including energy security, climate change, and other environmental benefits) in the same timescale as the proposed development***". A smaller development would not deliver the same generation capacity or energy security and climate change benefit as Rosefield Solar Farm, and as such would not represent a suitable alternative.

4.2.3. Section 2.10 of NPS EN-3 relates specifically to Solar Photovoltaic generation, and paragraphs 2.10.19 to 2.10.48 lists factors influencing site selection. The proposed Site has been selected following an in-depth site selection process in accordance with these key site selection factors outlined in section 2.10 of NPS EN-3. The site selection process involved a balance of these factors, including:

- **Network connection** – the site selection focused on the area around the National Grid East Claydon Substation where there was an available connection with preference given to sites in close proximity to the point of connection.
- **Irradiance and site topography** – preference was given to sites with a south facing aspect and flatter topography.
- **Proximity of site to dwellings** – the site selection sought to avoid sites in close proximity to residential dwellings or where it would not be possible to appropriately mitigate visual amenity and glint and glare.
- **Agricultural land classification and land type** – the site selection sought to minimise the impact on best and most versatile agricultural land.
- **Accessibility** – the site selection considered the suitability of the access routes to the proposed sites, both during construction and operation.

4.2.4. The Site was selected following an assessment against the above considerations as well as consideration of other environmental and spatial constraints, site size and land assembly, the availability of previously developed land and willingness of landowners for their land to be used. Site selection is a complex process which requires careful consideration against a range of factors. Some matters are more definitive in terms of the ability to proceed, such as grid connection and the physical suitability of the land to accommodate panels, while others are matters balanced and weighed against alternative options.

4.2.5. The Applicant aims to develop a nationally significant solar generation facility on a large site in order to contribute to meeting the UK Government's target of net zero carbon emissions by 2050.

4.2.6. The Applicant engaged with National Grid to discuss potential opportunities for a connection offer within the Buckinghamshire area. In Early 2020 a grid connection offer was made for capacity in East Claydon, Buckinghamshire.

4.2.7. Buckinghamshire is crossed by a number of high voltage transmission lines. These lines are important arteries of the National Electricity Transmission System, located between the demand centres of the south and the midlands. The number of lines in Buckinghamshire is sufficient to continue distributing electricity reliably to users while also having capacity for connection of large-scale generation facilities for transmission of power nationally. It is also in an area with relatively high levels of irradiation.

4.2.8. Against this background, the Applicant considered several important factors, as set out in the following section, before arriving at the preferred

Site. Site selection considerations for solar are set out in Section 2.3 of NPS EN-3 and considered below.

Irradiance and site topography

4.2.9. Paragraph 2.10.19 of NPS EN-3 sets out that irradiance (sunlight) and topography are key considerations for identifying a potentially suitable site, since these directly affect the amount of electricity that can be generated on a site. The site must be suitable for solar development and located within an area of sufficiently high irradiance and suitable topography.

4.2.10. Buckinghamshire represents a good location within the UK to construct a solar farm as demonstrated below (noting the constraints in other locations). The area benefits from higher levels of photovoltaic power and irradiance compared to the UK average, as shown in **Plate 4.1**.

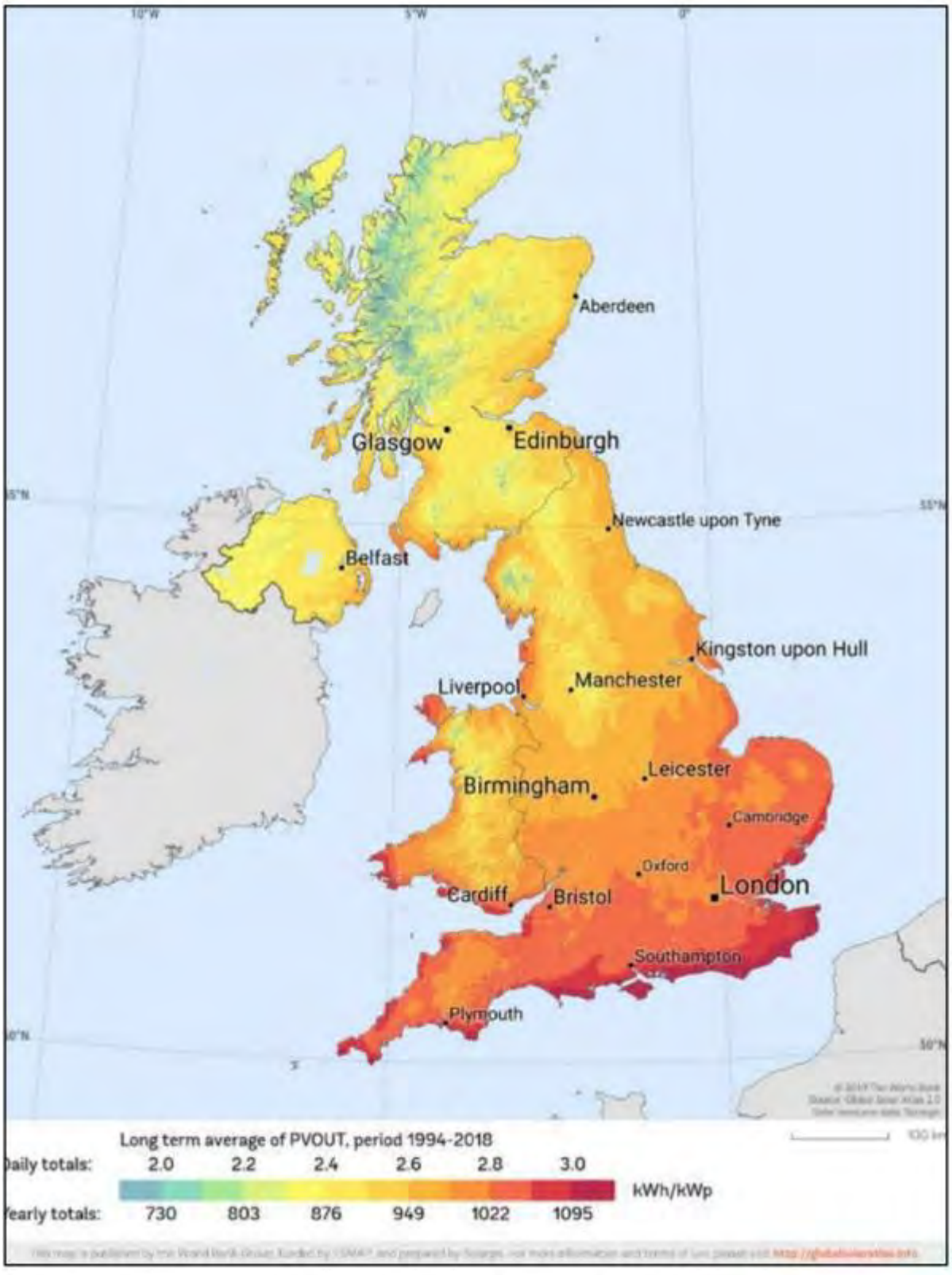

Plate 4.1: Average photovoltaic power

4.2.11. The general topography of the area surrounding the National Grid East Claydon Substation is gently undulating, making it generally suitable for solar. In combination with the other factors discussed below, the proposed Site was considered an appropriate location for development.

Grid connection and capacity

4.2.12. A viable grid connection is an essential material consideration for proceeding with a development and is instrumental in defining the search area.

4.2.13. The Site location was based on the availability of a suitable grid connection at the National Grid East Claydon Substation, with sufficient capacity to enable the power generated from the solar farm to feed back into the National Grid.

4.2.14. NPS EN-3 paragraph 2.10.24 sets out that the *"connection voltage, **availability of network capacity, and the distance from the solar farm to the existing network can have a significant effect on the commercial feasibility** of a development proposal"*. Paragraph 2.10.25 goes on to state that *"To **maximise existing grid infrastructure, minimise disruption to existing local community infrastructure or biodiversity and reduce overall costs applicants may choose a site based on nearby available grid export** capacity"*.

4.2.15. It is also important to note that the National Grid East Claydon Substation is on a transmission line connecting the South to the Midlands and, as such is near demand centres. This is good because:

- power has less far to travel to where it is needed; and,
- there is less opportunity for the power to be constrained (i.e. too much power flowing for the capacity of the wires), which might be the case if the Site was located, for example, much further north, or behind a boundary constraint.

4.2.16. Rosefield Solar Farm would contribute significantly to the need to supply low-carbon energy, in order for the government to meet its objectives and commitments, as set out in **Chapter 1: Introducing Rosefield Solar Farm** of this PEIR. Paragraph 2.10.61 of EN-3 sets out that *"for a solar **farm to generate electricity efficiently the panel array spacing should seek to maximise the potential power output of the site. The type, spacing and aspect of panel arrays will depend on the physical characteristics of the s**ite such as site elevation".*

4.2.17. As this is included as a factor influencing site selection, it is taken to mean that the site needs to be able to accommodate a sufficient megawatt capacity to deliver a viable solar farm of greater than 50 MW and also that the power output from the available land should maximise the available

grid connection and make the most efficient use of the site, whilst taking into account the scheme's potential impacts and other considerations as set out in EN-3.

4.2.18. A 10 km search area from National Grid East Claydon Substation was considered a viable cable connection distance for a solar project of this scale and was therefore selected on the basis of finding a site which could enable the delivery of parameters which would maximise generation from the Site, accounting for the environmental baseline and the mitigation and enhancement measures that may be necessary. Considering this search area, the Applicant approached landowners working outwards from the National Grid East Claydon Substation. A willing landowner was identified at land adjacent to the substation.

4.2.19. Rosefield Solar Farm understands that National Grid needs to replace the existing East Claydon Substation and equipment as it is coming to the end of its useful life. Permission for the replacement of National Grid East Claydon Substation is expected to be sought by National Grid in due course through a Town and Country Planning Act 1990 application. The replacement of the existing National Grid East Claydon Substation is not related to Rosefield Solar Farm.

Proximity of the Site to dwellings

4.2.20. NPS EN-3 paragraph 2.10.27 states that *"utility-**scale solar farms are large sites that may have a significant zone of visual influence. The two main impact issues that determine distances to sensitive receptors are therefore** likely to be visual amenity and glint and glare".*

4.2.21. The area surrounding the National Grid East Claydon Substation is characterised by dispersed small settlements, including East Claydon, Botolph Claydon, Granborough and Steeple Claydon, with the larger towns of Winslow to the east and Buckingham to the north. While the Site lies in relatively close proximity to Botolph Claydon, the Site boundary has been defined in a way which accommodates opportunities to limit any potential impacts through a combination of natural screening using both the existing landscape and proposed landscape interventions.

4.2.22. There are also relatively limited individual dwellings in close proximity to Site boundary. Through the evolution of the design to date the visual impact on residential receptors has been taken into account. For example, strategic setbacks from receptors to the above-ground infrastructure have been employed to limit visual impacts and the impact of glint and glare on residential receptors.

Environmental considerations

4.2.23. A key principle in the site search was to seek to avoid areas of particular environmental and landscape sensitivity in order to minimise potential

impacts. This is both from a natural and built environment perspective, including matters such as ecology and biodiversity, landscape, water resources and cultural heritage.

4.2.24. The area around National Grid East Claydon Substation is not subject to any protected landscape or spatial designations such as National Landscapes, National Parks or Green Belt. While it is a countryside location, it is recognised in NPS EN-3 para 2.10.31 that schemes of this type and scale will often need to be in a rural location, provided that the planning and environmental effects are acceptable.

4.2.25. The site selection process considered the following environmental factors which are also illustrated in **Figure 2.2 Environmental Features Plan**:

- **Designated international and national ecological and geological sites** – When selecting a site, any international and nationally designated sites were discounted from the site selection process so as to avoid direct impacts on these sites. The Site is not covered by any statutory environmental or landscape designations. Whilst the Site boundary is in close proximity to Sheephouse Wood SSSI and Finemere Wood SSSI, the Site boundary does not fall within the current boundaries and it was considered that the impacts on the species for which the SSSI are designated could be mitigated through detailed design (see below).
- **Nationally Designated Landscapes** – The presence of any nationally designated landscapes was considered and excluded from the area of search. There is no ancient woodland within the Site boundary. There a number of ancient woodlands adjacent to the Site including Sheephouse Wood, Shrubs Wood, Home Wood, Finemere Wood, Romer Wood, Decoypond Wood and Runts Wood;
- **Flooding** – The location of Flood Zones in the area were also considered. The majority of the Site is within Flood Zone 1 however some parts of Parcel 3 are in Flood Zones 2 and 3. It is not considered that this would prohibit viable solar development on Flood Zone 2 and 3 land as potential flooding impacts can be appropriately mitigated through detailed design. As such, areas within Flood Zones 2 and 3 were not discounted; and,
- **Heritage** – The presence of any historic designations, such as listed buildings and scheduled monuments were considered. There are no listed buildings or scheduled ancient monuments located within the Site boundary.

Agricultural land

4.2.26. Best and Most Versatile (BMV) agricultural land is classified as being within Grade 1, Grade 2 or Grade 3a. Paragraphs 2.10.28 to 2.10.34 of NPS EN-3 set out that, whilst not being a predominating factor, applicants

for solar NSIPs should take account of agricultural land classification. They state that applicants should seek in the first instance to locate their development on previously developed land, brownfield land, contaminated land, industrial land or lower grade agricultural land (classified as Grade 3b, 4 or 5), where possible. NPS EN-3 states that*: "While land type should **not be a predominating factor in determining the suitability of the site location applicants should, where possible, utilise previously developed** land, brownfield land, contaminated land and industrial land".*

4.2.27. The Applicant has taken into account agricultural land quality when identifying the Solar PV Site, based on publicly available national level data and field surveys.

4.2.28. According to the provisional and predictive Agricultural Land Classification (ALC) mapping (DEFRA and Natural England) this area of Buckinghamshire has a mixture of Grade 3 and 4 land. Based on this information, the lower grade helped guide the site selection process. Since selecting the Site, ALC surveys have been carried out which confirmed that 97% of the Site is Grade 3b. Further information is provided in **Chapter 10: Land, Soil and Groundwater**.

4.2.29. The Brownfield register, maintained by Buckinghamshire Council, shows that there is no brownfield land within a 10 km radius of the National Grid East Claydon Substation. Brownfield areas further away than this adjoin existing settlements and are significantly below the area required to deliver a utility-scale solar farm (all below 10 ha). Therefore, there is no suitable brownfield land within the surrounding area available to deliver renewable energy projects on the scale of Rosefield Solar Farm.

Accessibility

4.2.30. The Site is accessible by the rural road network and the strategic road network by the A41 and A421. This is an important factor when considering possible effects during construction and the ability of the road network to accommodate Heavy Goods Vehicles and potential Abnormal Indivisible Loads. Further information on transport and access is provided in **Chapter 14: Transport and Access**.

Land ownership

4.2.31. Following the identification of available capacity and recognising the irradiance, topography and relationship to environmental constraints of the areas in and around the National Grid East Claydon Substation, the Applicant started initial discussions with landowners to identify a suitable area of land for a solar farm capable of reflecting the capacity agreement with National Grid.

4.2.32. The early stage of the site search involved identifying interested landowners, as close as possible to the National Grid East Claydon

Substation. While the Applicant wasn't seeking smaller sites, as set out earlier in this Chapter, the Applicant did not seek to actively identify a single site of a particular size but was led by landowner discussions to identify potentially available land, its suitability for solar and whether it was likely to have environmental effects that were, or could be made to be, acceptable, having regard to the factors discussed above. The ability to reach voluntary agreement with landowners was a key requirement and therefore single, contiguous sites with as few landowners as possible were prioritised.

4.2.33. The area proposed to be used for solar development is within the ownership of a single landowner, located directly adjacent to the National Grid East Claydon Substation land, who was agreeable in principle to leasing their land for solar (thus limiting the need and scope for compulsory acquisition powers), with two other landowners needed to provide land needed for cabling and access near the existing National Grid East Claydon Substation.

4.3. Alternative renewable technologies

4.3.1. The Site is considered challenging for onshore wind energy generation due to the topography of the Site which would likely give rise to significant landscape and visual effects, alongside the proximity to residential dwellings which may be subject to adverse effects associated with shadow flicker and wind turbine noise. Wind farms also require more land to produce the same capacity as solar development. In addition, planning policy at the time made it exceptionally difficult to achieve planning consent for onshore wind, almost amounting to a moratorium by the Government on its development. Whilst policy had begun to change shortly after the project commenced, it had not yet reached a sufficiently supportive position for this type of energy infrastructure to be proposed.

4.3.2. The Site was not considered suitable for hydrogen technology due to the construction and commercial viability for this type of energy generation in comparison to solar energy generation. For example, there would need to be a significant source of water and a nearby off-taker or a hydrogen pipeline or road network that is capable of accommodating frequent HGV movements for the lifetime of a hydrogen development to deliver the hydrogen to end users.

4.3.3. It is therefore considered that solar technology is the best renewable energy generating solution for the Site, taking into account its suitable topography, relatively high solar irradiance, and other factors set out earlier in this Chapter.

4.4. Alternative solar technologies

4.4.1. Rosefield Solar Farm is proposing fixed north - south Solar PV panels. The parameters of the DCO application will maintain a degree of flexibility

to allow for the latest solar technology to be utilised at the time of construction. However, several alternative solar technologies and design options have been considered throughout the design process to date and several options have been discounted.

4.4.2. Tracker Panels have been discounted for this Site based on the unique landscape and visual impacts due to the increased height in comparison to fixed panels. Although small areas of the Site were considered suitable to support tracker panels, the majority of the Site was considered unsuitable due to anticipated visual effects. Consideration of the viability of Tracker Panels was also undertaken and they were not found to be commercially viable. As such, it was considered that installing tracker panels solely within these small areas, in comparison to a complete fixed panel installation across the entire Site would lead to greater environmental effects particularly from a landscape and visual and glint and glare perspective.

4.4.3. East - west fixed panels have different energy production efficiencies compared to north – south fixed panels, with lower energy production during the day compared to north – south fixed panels, and higher energy production in the morning and evenings. Higher energy production in the morning and evening would not be a significant benefit for the Site as the inclusion of a Battery Energy Storage System (BESS) as part of Rosefield Solar Farm will allow the storage and distribution of energy when required throughout the day and during peak hours. East – west fixed panels have also been discounted as they reduce the potential for biodiversity net gain and enhancements due to the reduced space between the panels. The reduced space between the panels would significantly reduce the level of light reaching the ground and would limit any biodiversity planting beneath the panels. The increased coverage and decrease of spacing between the panels for east – west fixed panels in comparison to south facing fixed panels would also lead to an increase in water accumulation on a smaller area of the Site.

4.5. Alternative layouts

4.5.1. The design and layout of Rosefield Solar Farm has formed part of an iterative process which has been informed by the ongoing environmental assessment process, site selection assessment and taking into consideration the design principles and controls, non-statutory consultation feedback and engagement with stakeholders and consultees.

4.5.2. A ‘no development’ alternative would not deliver the additional electricity generation capacity associated with Rosefield Solar Farm and would not satisfy the policy need and was therefore not considered further.

4.5.3. Engagement has included a series of collaborative design workshops, technical meetings with statutory consultees and meetings with

Buckinghamshire Council officers. The feedback from the engagement held to date has informed the proposed design layout.

4.5.4. The layout of Rosefield Solar Farm will continue to be developed as part of the environmental assessment process and will have regard to outputs from engagement with stakeholders and consultees and feedback from statutory consultation.

4.5.5. A Consultation Report will be submitted in support of the DCO application, which will provide a summary of consultation feedback and how the Applicant has had regard to the feedback in developing the proposals. A Design Statement will also be prepared and submitted in support of the DCO application which will set out the evolution of the Rosefield Solar Farm design.

4.5.6. The layout and extent of Rosefield Solar Farm has been through two stages of design iterations to date. The first stage of design (Stage 1) was held prior to the public launch of Rosefield Solar Farm for non-statutory consultation and EIA scoping. The second stage of design (Stage 2) related to the design that has been presented within this PEIR to inform statutory consultation.

4.5.7. The two stages of the design development so far are discussed further below.

Stage 1 Design

4.5.8. Following identification of the initial Site boundary as outlined in this chapter, the available land within the Site boundary was subject to an initial assessment to identify suitability for Solar PV development and potentially suitable locations for the BESS and the Rosefield Substation. The assessment focussed on the suitability of land parcels based on environmental, social and economic factors. Minimum offsets to landscape and ecological features were agreed by the design team to inform the design process.

4.5.9. There are areas between Parcel 1, Parcel 2 and Parcel 3 that lie within the Site boundary but have not been considered for Solar PV, BESS or Substation development. These are shown as grey areas within the Stage 1 Design (**Figure 4.1: Alternative Layouts – Solar PV Development Stage 1**). These areas were not made available by the landowner to the Applicant for Solar PV, BESS or Substation development; however, they were made available for underground cabling, access tracks etc.

Solar PV development

4.5.10. Following the initial assessment, which included desktop assessments and visits to the Site, the design team identified fields which were considered unsuitable for accommodating Solar PV development and were therefore

discounted. The reasoning for discounting these fields during Stage 1 of the design is detailed within **Table 4.1**.

Table 4.1 – Reasons for discounting fields at Stage 1

Field	Reason for removal
B17	This field comprises Knowl Hill and is elevated above the surrounding area. Potential for solar development was removed from this field to reduce potential significant impacts on the setting and significance, and views from Claydon Park Grade II Registered Park and Garden and Conservation Area and Claydon House Grade I listed building.
D2, D5	The fields directly south of Botolph Claydon were removed due to the proximity to residential developments and the setting of Botolph Claydon and the Conservation Area.

4.5.11. The areas that were removed from development were retained within the Site for potential mitigation, enhancement or retained agricultural use.

Battery Energy Storage System and Rosefield Substation

4.5.12. During the Stage 1 initial appraisal, the design team also carried out an assessment to identify fields that would be suitable for the BESS and Rosefield substation based on the information available at the time of assessment. The areas that were considered suitable for BESS and project substation were areas that could potentially accommodate infrastructure up to 7.6 m and 15 m respectively (as per Stage 1 design parameters).

4.5.13. The following factors have informed the development of the design:

- Proximity to the Grid Connection;
- Proximity and visual impact to the residential settlement of Botolph Claydon;
- Impact on the setting of Botolph Claydon Conservation Area;
- Views from Quainton Hill;
- Located outside areas of flood risk;
- Proximity and impact on nearby dwellings;
- Proximity and location of PRoW, particularly the Bernwood Jubilee Way running through Site 2.

Stage 2 design

4.5.14. Following the non-statutory consultation held between September – November 2023, the Stage 1 design was reviewed and revised to take account of the consultation feedback, the emerging results from environmental studies and on-going technical work.

4.5.15. This Stage 2 design process involved undertaking a detailed environmental appraisal, targeted engagement with statutory consultees and stakeholders, alongside several technical design workshops.

Solar PV development

4.5.16. Following the Stage 2 design process, a number of changes have been made to the Rosefield Solar Farm proposals, including removal of fields and partial fields from proposed Solar PV development and cable routing, and the addition of new areas for cable routes and access tracks and temporary construction compounds. **Table 4.2** provides a summary of the changes.

Table 4.2 – Reasons for changes at Stage 2

Location	Reason for change
Field B9 (partial)	Eastern half of this field has been removed from proposed Solar PV development to reduce potential significant impacts on the setting and significance, and views from Claydon Park Grade II Registered Park and Garden and Conservation Area and Claydon House Grade I listed building.
Sections of particular fields were removed, including an area within the Fields B6, B5, B13, B22	Parts of these fields have been removed from proposed Solar PV development to provide larger setbacks from residential properties and PRoW. Initial site visits and a residential visual amenity assessment showed particularly high residential amenity impacts and landscape and visual impacts for the nearby residential properties. The extent of the removal of Solar PV development was reviewed for each individual location to provide a suitable offset.
Parcel 1a (Fields C1, C2 and C3)	These fields were removed from proposed Solar PV development to minimise impacts to the bat population and allow for additional mitigation proposals. The removal of these fields also reduces views of Rosefield Solar Farm from the surrounding area.
Fields D1, D3 (south)	These fields were removed from proposed Solar PV development and no longer form part of the proposed Site area due to their proximity to residential developments and the setting of Botolph Claydon and the Conservation Area. These

	fields were identified as areas of concern in public feedback to the non-statutory consultation.
Fields D27, D30, D32, D33, D34, D35, D36, D37	These fields were removed from proposed Solar PV development due to their rising landform within the Area of Attractive Landscape (AAL) (local designation) resulting in them being particularly visible from the wider landscape, compared to other areas in the AAL.
Sections of particular fields were removed, including an area within the Fields D4, D11, D15, D14	Parts of the fields located to the east of the Bernwood Jubilee Way were removed from proposed Solar PV development during Stage 2 of the design to reduce the impact on the landscape character and visual setting towards Quainton Hill and the Area of Attractive Landscape.
Land between Parcels 1 and 2	Areas of land south of Orchard Way between Parcels 1 and 2 and adjacent to Balmore Wood, between Balmore Wood and Runts Wood and between Greatsea Wood and Finemere Wood no longer form part of the proposed Site area as they are no longer needed for underground cable routes, access tracks or temporary construction compounds.
Land to the east and west of the existing National Grid East Claydon Substation	Additional fields to the east and west of the existing National Grid East Claydon Substation have been included within the Site boundary as areas for underground cable routes, access tracks and temporary construction compounds.
Snake Lane and Lee Road	Small stretches of these roads have been added to the Site boundary to allow road widening and improvement works needed for construction traffic.

4.5.17. Following the Stage 2 design process, detailed above, the area proposed to accommodate Solar PV development reduced by around 40% compared to the Stage 1 design. The areas that were removed from having the potential for development have largely been retained within the Site boundary for potential mitigation, enhancement or retained agricultural use, while some areas around Botolph Claydon have been removed entirely from the Site boundary.

4.5.18. The design will continue to be refined prior to submitting the DCO application in order to give regard to feedback from statutory consultation, further stakeholder engagement and the findings of further environmental and technical assessments.

Battery Energy Storage System and Rosefield Substation

4.5.19. Following the Stage 2 design and further survey work, a further assessment was carried out to review and identify suitable locations for the BESS and Rosefield Substation. The location for the BESS compound and Rosefield Substation has not been fixed, however the following fields are being considered for siting BESS: Fields D8, D9 and E23, as shown by the Indicative siting zone for BESS within **Figure 1.2: Zonal Masterplan** in **Volume 2**. It is noted that, although all three fields are identified as being potentially suitable for BESS, the final design may not include BESS on all three fields. For the purposes of the preliminary assessment, there are two scenarios for the BESS locations in conjunction with the location of the Rosefield Substation, that have been assessed as part of this PEIR:

- Scenario 1: Rosefield Substation in Field E11 and BESS units located in Fields D8, D9 and E23 (outlined in **Figure 4.2: Zonal Masterplan Scenario 1** in **Volume 2**).
- Scenario 2: Rosefield Substation in Field E23 and BESS units located in Fields D8, D9 and E23 (outlined in **Figure 4.3: Zonal Masterplan Scenario 2** in **Volume 2**).

Cable Routes and Internal Access Tracks

4.5.20. The areas identified for cable routes and access tracks, presented in **Figure 3.2: Indicative Cable Route Location Plan**, shows the wider area that is being considered for this infrastructure. The cable route and access track routes are subject to an iterative design process informed by ongoing environmental and engineering surveys and engagement with the landowner and stakeholders. The location of this infrastructure will be refined following engagement and further work with the refined routes being presented in the ES.

4.5.21. The indicative location of the cabling routes between Parcel 1, 2 and 3 have been informed by initial assessments of known environmental features, including the location of trees, woodlands, hedgerows and waterways with buffers to sensitive receptors, such as ancient woodlands and residential developments, applied.

4.6. Summary of Findings

4.6.1. A range of technical, environmental and economic factors are considered when investigating and assessing any potential site for large scale developments. The availability of the point of connection at East Claydon Substation and the need to maximise this capacity has driven the initial site selection for this project.

4.6.2. Importantly, the Site has been selected because of its availability and suitability for large scale solar deployment, from irradiance and topography to a lack of environmental constraints. There is a demonstrable urgent need for renewable energy development and Rosefield provides a significant opportunity to make a major contribution towards the UKs obligations in delivering Net Zero.

5. Approach to the EIA

5.1. Environmental Impact Assessment (EIA)

5.1.1. EIA is a systematic process that examines the likely significant effects (beneficial or adverse) on the environment resulting from the construction, operation (including maintenance) and decommissioning of a proposed development. The process is shown on **Plate 5.1: Main stages of the EIA process**.

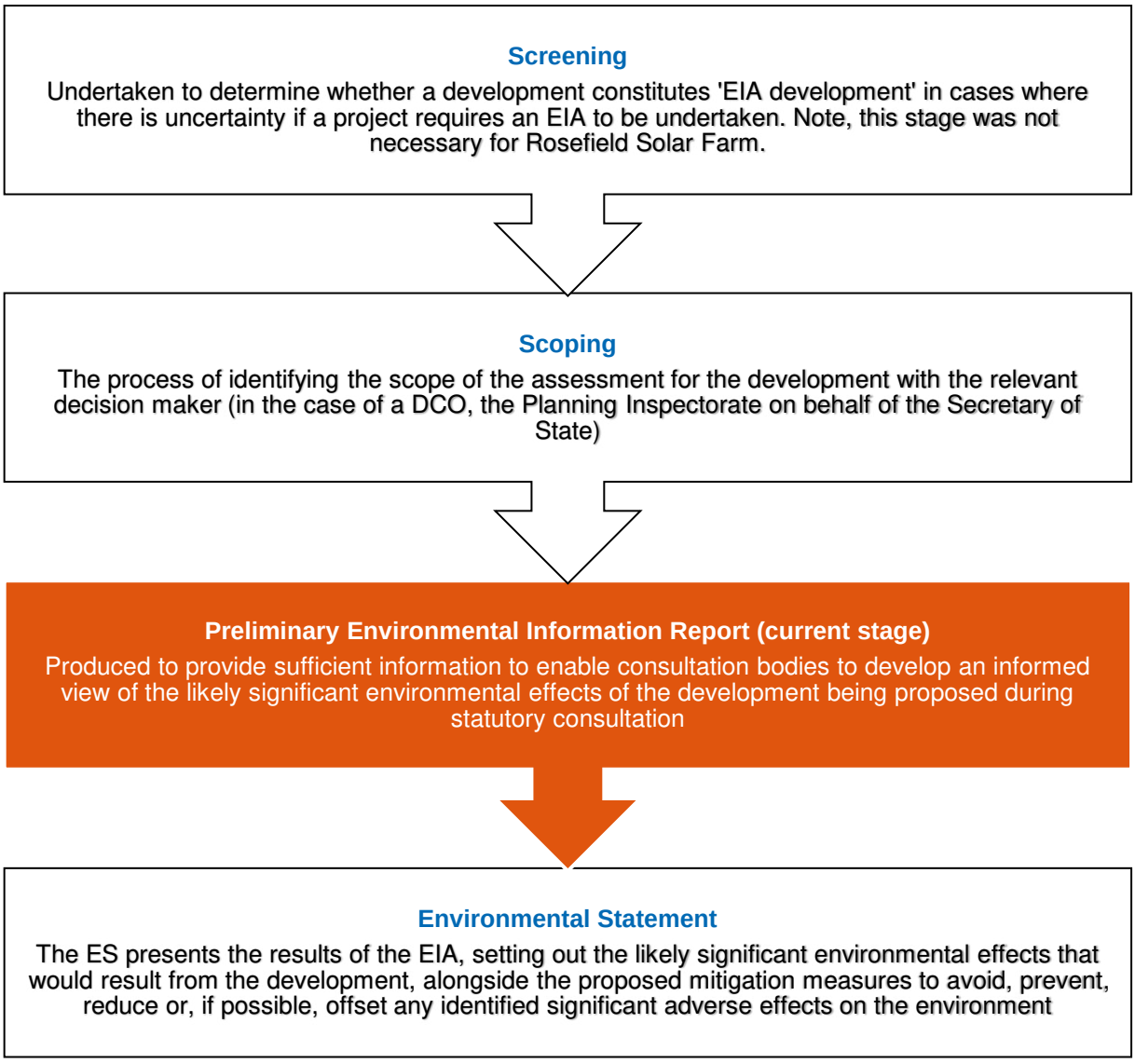

Plate 5.1: Main stages of the EIA process

5.1.2. An Environmental Statement (ES) is proposed to be submitted as part of the application for this DCO. An ES is used to report to decision makers, consultees and stakeholders on the likely significant environmental effects of a development and helps the decision maker (in the case of a DCO, the Secretary of State) determine the application for consent.

5.2. Stakeholder engagement

5.2.1. Consultation and engagement alongside the EIA process is critical to the development of a comprehensive and proportionate ES. The views of statutory and non-statutory consultees are important to ensure that from the outset that the EIA focuses on specific issues where significant environmental effects are likely, and where further investigation is required.

5.2.2. Early engagement with consultees has been important in influencing the design process of Rosefield Solar Farm to date. Consultation and engagement, as an ongoing process, enables design evolution and embedded and additional mitigation measures to be incorporated into Rosefield Solar Farm to limit adverse environmental effects and optimise environmental benefits. This PEIR forms an important part of this process. The consultation responses and the regard had to them will be recorded in a Consultation Report and design development detailed within the Design Approach Document, both of which will be submitted in support of the DCO application.

5.2.3. The Applicant has undertaken engagement with statutory consultees and a variety of representative local groups to gather views to help develop the design of Rosefield Solar Farm at an early stage to enable the sharing and consideration of local knowledge. These stakeholders include Buckinghamshire Council, local parish councils, statutory environmental consultees and local interest groups.

5.2.4. Non-statutory consultation was held from 28 September until 10 November 2023.

5.2.5. The aim of non-statutory consultation was to:

- Outline the broad parameters of Rosefield Solar Farm;
- Gather feedback on the early design; and
- Understand key community and stakeholder concerns, insights and proposed design enhancements.

5.2.6. **Chapter 4: Reasonable Alternatives Considered** provides a summary of the evolution of the design of Rosefield Solar Farm to date following the feedback received at non-statutory consultation and the results of further environmental surveys.

5.2.7. The Consultation Report will provide a summary of the feedback received to the non-statutory and statutory consultation and describe how the feedback has been taken into account in the development of the proposals presented.

5.2.8. As part of the EIA process, consultation and engagement is ongoing with a range of statutory and non-statutory consultees to help inform the design of Rosefield Solar Farm.

5.2.9. Several meetings have been held with consultees to provide further information on the design development, survey progress and to agree the approach to the methodology for environmental surveys and assessment. Those consultees contacted to date include (but are not limited to):

- Buckinghamshire Council;
- Natural England;
- Historic England;
- Environment Agency;
- Berkshire, Buckinghamshire, and Oxfordshire Wildlife Trust;
- National Highways; and
- Buckinghamshire Fire and Rescue Service.

5.2.10. The consultation and engagement undertaken for each of the environmental factor assessments is provided in further detail in **Chapters 6** to **16** of this PEIR.

5.3. Flexibility of design options

5.3.1. The design of Rosefield Solar Farm is ongoing and this PEIR provides a preliminary environmental assessment of the design to date.

5.3.2. In order to maintain flexibility in the design, a 'Rochdale Envelope' approach within parameter ranges is being taken. The Planning Inspectorate's Advice Note Nine 'Rochdale Envelope'[27] provides specific guidance to applicants on the degree of flexibility that could be considered appropriate under the Planning Act 2008[28] regime.

5.3.3. The Rochdale Envelope is an acknowledged way of dealing with an application comprising EIA development where details of the scheme have not been fully resolved by the time the DCO application is submitted. The term is used to describe those elements of a scheme that have not yet been finalised, but can be accommodated within certain limits and

[27] Planning Inspectorate (2018) Advice Note Nine: Rochdale Envelope (Version 3). Available online: https://www.gov.uk/government/publications/nationally-significant-infrastructure-projects-advice-note-nine-rochdale-envelope
[28] Planning Act 2008. Available online: https://www.legislation.gov.uk/ukpga/2008/29/section/14

parameters, allowing the likely significant environmental effects of the scheme to be presented as a reasonable 'worst case'.

5.3.4. The preliminary design parameters for Rosefield Solar Farm for the purpose of this preliminary assessment of likely effects are as set out in **Chapter 3: Description of Rosefield Solar Farm**.

5.3.5. As the design of Rosefield Solar Farm evolves, further information will become available and key elements of the design will be refined and further defined. However, it is likely that flexibility will need to be maintained for some aspects of Rosefield Solar Farm for the DCO application. Where flexibility is to be retained in the DCO application, the parameters will form the likely worst case envelope for Rosefield Solar Farm to be reported within the ES.

5.3.6. The current optionality that Rosefield Solar Farm is exploring within the design is set out in **Table 5.1** below.

Table 5.1 – Optionality of project elements at PEIR stage

Project element	Optionality
Solar PV modules	The indicative area for Solar PV modules is shown in light blue on the **Figure 1.2: Zonal Masterplan** in **Volume 2**. Some of these areas overlap with Indicative Siting Areas for the Battery Energy Storage System (BESS), Collector Compounds and Rosefield Substation hence there is optionality within these areas; Solar PV modules may or may not occur within these areas depending on the preferred location of the BESS, Collector Compounds and Rosefield Substation. The worst case extent of Solar PV modules has been assessed in this PEIR.
Balance of Solar System	The location of the BoSS has not yet been defined. Generally, the BoSS would comprise locating the inverter, transformer and switchgear equipment, independently outdoors, or within an enclosed Inverter and Transformer Station (ITS) located throughout the fields shown in light blue on **Figure 1.2: Zonal Masterplan** in **Volume 2**. Some of these areas overlap with Indicative Siting Areas for the BESS, Collector Compounds and Rosefield Substation - hence there is optionality within these areas; BoSS may or may not occur within these areas depending on the location of the BESS, Collector Compounds and Rosefield Substation.

Project element	Optionality
	The inverters required as part of the BoSS are expected to be central inverters sited at regular intervals amongst the Solar PV modules which would be located outdoors or within an enclosed ITS container. This preliminary assessment assumes the BoSS to be located independently outdoors and that central inverters would be used, as this is considered to be the worst case scenario, unless outlined in the environmental factor assessment chapters (**Chapters 6** to **16**).
Satellite Collector Compounds	There are five fields that are considered suitable for the two Satellite Collector Compounds, as shown on **Figure 1.2: Zonal Masterplan** in **Volume 2**. However, it is anticipated that one Collector Compound will be required in both Parcel 1 and Parcel 2. There is overlap between the Satellite Collector Compound in Parcel 2 and the BESS Indicative Siting Zone in the same location. It is assumed that the two Satellite Collector Compounds could be sited anywhere within the Indicative Siting Zone. One Satellite Collector Compound would be located in either of the below fields in Parcel 1: • Field B10 • Field B23 (South) One Satellite Collector Compound would be located in either of the below fields in Parcel 2: • Field D8 • Field D9 • Field D17 The reasonable worst-case location for each environmental factor assessment is outlined in **Chapters 6** to **16**.
Main Collector Compound	There are four fields that are considered suitable for the Main Collector Compound, which are located in Parcel 3, as outlined in **Figure 1.2: Zonal Masterplan** in **Volume 2** and detailed below. • Field E23

Project element	Optionality
	• Field E22 • Field E21 • Field E20 The reasonable worst-case location for each environmental factor assessment is outlined in **Chapters 6** to **16**.
BESS	There are several fields (B8, B9 and E23) that are being considered for the siting of the BESS, as outlined within **Figure 1.2: Zonal Masterplan** in **Volume 2**. It is noted that, although all three fields are identified as being potentially suitable for BESS, the final design may not include BESS on all three fields. For the purposes of this preliminary assessment, there are two scenarios for the BESS locations in conjunction with the Rosefield Substation. Scenario 1. Rosefield Substation in Field E11 and BESS units located in Fields D8, D9 and E23 (outlined in **Figure 4.2: Zonal Masterplan Scenario 1** in **Volume 2**) Scenario 2. Rosefield Substation in Field E23 and BESS units located in Fields D8, D9 and E23 (outlined in **Figure 4.3: Zonal Masterplan Scenario 2** in **Volume 2**)
Rosefield Substation	Two fields are being considered for the location of the Rosefield Substation as indicated as 'Rosefield Substation Indicative Siting Zones' (marked as S) on the **Figure 1.2: Zonal Masterplan** in **Volume 2**. There is overlap between the BESS and Collector Compound Indicative Siting Zones in Parcel 3. For the purposes of this preliminary assessment, the following Rosefield Substation locations in conjunction with the BESS, have been assessed as part of this PEIR: Scenario 1. Rosefield Substation in Field E11 and BESS units located in Fields D8, D9 and E23 (outlined in **Figure 4.2: Zonal Masterplan Scenario 1** in **Volume 2**). Scenario 2. Rosefield Substation in Field E23 and BESS units located in Fields D8, D9 and

Project element	Optionality
	E23 (outlined in **Figure 4.3: Zonal Masterplan Scenario 2** in **Volume 2**).
Main Construction Compounds	Nine fields are being considered for the locations of the three Main Construction Compounds, as indicated on **Figure 3.6: Indicative Location Suitable for the Main and Satellite Construction Compounds** in **Volume 2**. It is anticipated that only one will be required within Parcels 1, 2 and 3. It is assumed that the three Main Construction Compounds could be sited anywhere within the Indicative Siting Zone. One Main Construction Compound would be located in either of the below fields in Parcel 1: • Field B23 (South) • Field B20 One Main Construction Compound would be located in either of the below fields in Parcel 2: • Field D7 • Field D8 • Field D9 One Main Construction Compound would be located in either of the below fields in Parcel 3: • Field E21 • Field E22 • Field E23 • Field SA50 The reasonable worst-case location for each environmental factor assessment is outlined in **Chapters 6** to **16**.
Satellite Construction Compounds	Eight fields are currently being considered for the locations of the three Satellite Construction Compounds, as indicated on **Figure 3.6: Indicative Location Suitable for the Main and Satellite Construction Compounds** in **Volume 2**). It is anticipated that only one will be required in Parcel 1, 2 and 3.

Project element	Optionality
	It is assumed that the three Satellite Construction Compounds could be sited anywhere within the Indicative Siting Zone. One Satellite Construction Compound would be located in either of the below fields in Parcel 1: • Field B3 • Field B6 • Field B7 • Field B10 One Satellite Construction Compound would be located in the below field in Parcel 2: • Field D27 One Satellite Construction Compound would be located in either of the below fields in Parcel 3: • Field E10 • Field E11 • Field E20 The reasonable worst-case field within each parcel for the Satellite Construction Compound and closest location within that field to the sensitive receptor has been assessed. The reasonable worst-case for each environmental factor assessment is outlined in **Chapters 6** to **16**.
Cable route to connect the Solar PV Modules, BoSS, Collector Compounds, Rosefield Substation and BESS	The indicative location of the main cable route between the Parcels and the potential routing options detailed below and presented in **Figure 3.2: Indicative Cable Route Location** in **Volume 2**. • Option A – Indicative cable route to the north of Home Wood, connecting Parcel 1 and 2 • Option B – Indicative cable route to the south of Home Wood, connecting Parcel 1 and 2 For the purposes of this preliminary assessment, Option B has been assessed as this is considered to be the worst case scenario, unless outlined in the environmental factor assessment chapters (**Chapters 6** to**16**).

5.3.7. The scenario assessed in this PEIR will vary between the environmental factors depending on the worse-case scenario relevant to that environmental factor. Further detail on the scenario assessed for each environmental factor is presented in **Chapters 6** to **16**.

5.4. Establishing baseline conditions

5.4.1. The baseline environment comprises the existing environmental characteristics and conditions, based upon desk-based studies and field surveys undertaken and information available at the time of undertaking this preliminary assessment.

5.4.2. The establishment of the environmental baseline is essential to assist with the comparison against future changes as a result of Rosefield Solar Farm and to assess the likely significant environmental effects of Rosefield Solar Farm.

5.4.3. Specific details of the approach taken to establishing preliminary baseline conditions are provided within **Chapters 6** to **16** of this PEIR. Baseline conditions have been established by:

- Site visits and surveys;
- Desk based studies; and
- Modelling.

5.4.4. This PEIR provides an overview of the current environmental baseline for the purposes of this preliminary assessment, as set out within **Chapters 6** to **16**. **Chapters 6** to **16** also outline where further studies or survey work will be undertaken as part of the ongoing EIA. The reports detailing the results of further baseline studies or surveys will be provided within the ES.

5.5. Establishing future environmental conditions

5.5.1. Schedule 4(3) of the EIA Regulations[29] requires consideration of the likely evolution of the current state of the environment (baseline scenario) in the absence of Rosefield Solar Farm, as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge (the 'future baseline').

[29] The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. Available online: https://www.legislation.gov.uk/uksi/2017/572/contents/made

5.5.2. Each individual factor assessment chapter (**Chapters 6** to **16**) provides a description of the future baseline scenario and the data sources that have informed it, where relevant.

5.6. Assessment scenarios considered

5.6.1. The assessment scenarios considered for Rosefield Solar Farm are as follows:

- Existing environmental baseline (without Rosefield Solar Farm) - Reported at the time that the baseline data have been collected;
- Future environmental baseline (without Rosefield Solar Farm) – For comparison with the construction phase, operational phase (including maintenance), and decommissioning phase. It should be noted that without Rosefield Solar Farm, the Site is assumed to continue to be occupied for agricultural use;
- Construction of Rosefield Solar Farm - As presented in **Chapter 3: Description of Rosefield Solar Farm**, construction is scheduled to commence in Q3 2028 and last for up to 30 months. Where relevant, each individual factor assessment chapter has assessed the relevant reasonable ‘worst case’ construction scenario and where necessary, the relevant period or 'peak' of activity within the construction programme;
- Operation (which includes maintenance) of Rosefield Solar Farm – As presented in **Chapter 3: Description of Rosefield Solar Farm**, it is assumed that Rosefield Solar Farm will be operational and maintained for a duration of 40 years; and
- Decommissioning of Rosefield Solar Farm - As presented in **Chapter 3: Description of Rosefield Solar Farm**, decommissioning activities will begin following the cessation of the operational Rosefield Solar Farm and will take approximately 24 months.

5.7. Approach to the preliminary assessment

5.7.1. The EIA process requires the identification of the likely significant environmental effects of Rosefield Solar Farm.

5.7.2. This PEIR reports on the preliminary likely significant environmental effects for the construction (including site preparation and earthworks), operational (i.e., once completed and open to use, and including maintenance) and (where relevant) decommissioning phases of Rosefield Solar Farm, based on information available to date.

5.7.3. The following criteria is taken into account when determining significance:

- The receptors/resources (natural and human) which would be affected and the pathways for such effects;
- The geographic importance, sensitivity or value of receptors/resources;

- The duration (short-term, medium-term or long-term); permanence (permanent or temporary) and changes in significance (increase or decrease);
- Reversibility - e.g., whether the change is reversible or irreversible, permanent or temporary;
- Environmental and health standards (e.g., local air quality standards) being threatened; and
- Feasibility and mechanisms for delivering mitigating measures e.g., Is there evidence of the ability to legally deliver the environmental assumptions which are the basis for the assessment?

5.7.4. The method for assessing significance of effects varies between environmental factors but, in principle, will be based on the environmental sensitivity (or value/importance) of a receptor/resource and the magnitude of change from the baseline conditions. The approach to assessing the significance of effects for each individual environmental factor assessment is outlined within **Chapters 6** to **16**.

5.7.5. A distinction will be made between direct, indirect, secondary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects. Cumulative effects will be considered as a single coordinated assessment.

5.7.6. The approach taken to the preliminary assessment of cumulative effects is reported in **Chapter 18: Cumulative Effects**.

5.8. Approach to mitigation

5.8.1. Mitigation can be relied on to reduce any potential likely significant environmental effects from Rosefield Solar Farm. The consecutive steps of the mitigation hierarchy are as follows:

- Avoidance: Take measures to avoid creating impacts from the outset;
- Minimisation: Measures taken to reduce the duration, intensity and extent of the impact if they cannot be avoided;
- Restoration: Measures taken to improve ecosystems following exposure to unavoidable impacts; and
- Offset: Measures taken to compensate for any residual impacts.

5.8.2. The Institute of Environmental Management and Assessment's (IEMA) 'Environmental Impact Assessment Guide to Shaping Quality

Development'[30] refers to three distinct forms of mitigation:

- Primary: An intrinsic part of the project design;
- Secondary: Typically described within the factor chapters of the ES, but often are secured through legal requirements and/or management plans; and
- Tertiary: Required regardless of any EIA, as it is imposed, for example, as a result of legislative requirements and/or standard sectoral practices.

5.8.3. For the purposes of this PEIR and the ES, embedded 'primary' mitigation measures will form part of Rosefield Solar Farm for which consent is sought. **Table 5.2** describes the embedded (primary) environmental mitigation measures that are considered to be an inherent part of Rosefield Solar Farm i.e., the design principles adopted to avoid or prevent adverse environmental effects, based on the design of Rosefield Solar Farm to date. **Figure 3.4: Landscape and Ecological Mitigation and Enhancements Plan** illustrates the embedded high level landscape and ecological mitigation measures. It should be noted that these will likely evolve over the course of the design evolution, up to submission of the DCO application.

5.8.4. These embedded (primary) environmental mitigation measures should not be confused with additional (secondary and tertiary) mitigation measures which avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment, which are described within each environmental factor assessment (**Chapters 6** to **16**). Examples of additional (secondary and tertiary) mitigation include implementation of management plans and acoustic noise barriers.

Table 5.2 – Embedded (primary) environmental mitigation measures

Embedded (primary) environmental mitigation measure
A minimum 20 m offset from HS2 woodland planting (adjacent to Parcel 1) to the fence line of the Solar PV modules.
A minimum 30 m offset from all fence lines within Rosefield Solar Farm to statutorily and locally designated wildlife sites (i.e. Sheephouse Wood SSSI).

[30] IEMA (2015), 'Environmental Impact Assessment Guide to Shaping Quality Development', Available at:
[redacted]

Embedded (primary) environmental mitigation measure
A minimum 30 m offset from all fence lines within Rosefield Solar Farm to ancient woodlands (i.e. Runts Wood).
A minimum 20 m offset from all fence lines within Rosefield Solar Farm to existing woodlands.
A minimum 10 m offset from all fence lines within Rosefield Solar Farm to existing hedgerows.
Minimum offset of least 10 m either side of Main Rivers, and 6 m from ditches and ordinary watercourses, to all fence lines within Rosefield Solar Farm.
A minimum 50 m offset from all fence lines within Rosefield Solar Farm to existing main [redacted]
A minimum 55 m offset from all fence lines within Rosefield Solar Farm to Bernwood Jubilee Way.
A minimum 20 m offset from all fence lines within Rosefield Solar Farm to Midshires Way.
A minimum 10 m offset from all fence lines within Rosefield Solar Farm to all other existing and proposed public rights of way except where crossings are necessary.
A minimum 250 m offset from the fence line around the ITS, BESS, Rosefield Substation and Collector Compounds to residential properties, determined on a case by case basis.
Offsets from the fence line around the Solar PV development to residential properties determined on a case by case basis.
Removal of Know H**ill** (Field B17) and half of Field B9 from Solar PV development.
Removal of fields in the southern part of Parcel 2 (Fields D27 and D30 to D37) from Solar PV development.
Removal of fields in Parcel 1a (Fields C1, C2 and C3) from Solar PV development.
Removal of fields south-west of Botolph Claydon (Fields D1, D2, D3 North, and D5) from Solar PV development.
The panel design and panel height of the Solar PV modules within Flood Zone 3 will be above the flood water level.
The Solar PV modules design will include a rainwater gap.
Siting of Satellite Collector Compounds, Main Collector Compounds, Rosefield Substation and BESS will be outside of Flood Zone 2 and Flood Zone 3.

Embedded (primary) environmental mitigation measure
A formalised surface water drainage strategy will be included for Satellite Collector Compounds, Main Collector Compounds, Rosefield Substation and BESS.
A fire water runoff drainage provision will be included for the BESS.
No Solar PV development will occur within the centre/north of the Site (between Parcels 1, 1a and 2).
Historic hedgerows will be preserved as far as possible.
Any vegetation cleared to facilitate the construction of Rosefield Solar Farm will be compensated during operation by a planting scheme that equals or exceeds the current levels of vegetation.
The condition and integrity of assets will be regularly assessed, and maintenance undertaken as early as required, giving consideration to materials with enhanced tolerance to fluctuating temperatures and exposure to rainfall.
Best and Most Versatile land will be avoided as far as possible.
Internal access tracks and cable routes would use existing tracks, crossings and/or gaps in the hedgerows where reasonably practicable.
The cable routes would comprise underground cables – cabling routes will run alongside access tracks as much as possible to avoid wider excavations.
The use of concrete, trenches and foundations would be minimised where reasonably practicable.
Use of equipment with low noise emissions will be specified, where feasible.
Noise emitting equipment will be orientated to reduce noise level beyond the Site boundary.
The proposed access route will avoid passing through villages as far as is possible.
The Site access junctions will be designed to allow for two-way traffic flows and sufficient visibility in all directions.
All HGV traffic for the BESS and north-eastern portion of the Site will be routed through the main access and will approach Granborough Road from Quainton Road, removing the need for a constrained 90 degree turn at the junction.

5.8.5. Mitigation will be secured through the DCO process, for example as requirements in the DCO, to ensure that it is delivered as part of Rosefield Solar Farm.

5.9. Difficulties and uncertainties

5.9.1. Factor-specific difficulties and uncertainties are set out in the individual factor assessments (**Chapters 6** to **16**). The following key general difficulties and uncertainties apply to a number of environmental factor assessments:

- The detailed design of Rosefield Solar Farm is still developing, as are the environmental surveys and assessments required to support the planning and EIA process. This PEIR is prepared based on the preliminary information available at the time of writing. Each environmental factor section clearly sets out the additional work, including any surveys, that is required to inform the ES;
- The preliminary information presented in this PEIR is based on construction information available at the time of writing and based on reasonable worst-case assumptions;
- As the location and area of the components that Rosefield Solar Farm comprises are not yet defined or fixed, there is potential for uncertainty regarding the scope of assessment for each factor. However, this is avoided because **Chapter 3: Description of Rosefield Solar Farm** details the maximum parameters of Rosefield Solar Farm components as they are currently known. The preliminary assessment presented within this PEIR is based on a reasonable 'worst-case scenario' based on the maximum parameters and optionality presented; and
- Data from third parties relied upon for the baseline against which any effects have been assessed could potentially be out of date or inaccurate. However, any such data have been sourced and secured from reputable and industry standard sources. Data have been reviewed and used by competent and experienced professional experts. The combination of appropriate data sources being used by competent and experienced experts ensures that the data is suitable for its purpose, and therefore provides an appropriate evidence base from which the existing environmental baseline (as it is currently known) has been informed.

6. Air Quality

6.1. Introduction

6.1.1. This chapter presents a preliminary assessment of the likely significant effects arising from the construction, operation (including maintenance) and decommissioning of Rosefield Solar Farm upon air quality and should be read in conjunction with the following appendix in **Volume 3**:

- **Appendix 6.1: Request for Comments on the Proposed Air Quality Assessment**

6.2. Stakeholder engagement

6.2.1. A method statement, as reproduced in **Appendix 6.1** in **Volume 3**, detailing the proposed air quality assessment scope and methodology was submitted to Buckinghamshire Council on 24 May 2024 to seek their agreement on the proposed approach to the air quality assessment. We are awaiting feedback on the proposed approach at the time of writing.

6.3. Legislative framework, planning policy and guidance

6.3.1. The preliminary assessment has been undertaken with regard to the following legislation, planning policy and guidance.

Legislation

- Directive 2008/50/EC of the European Parliament and of the Council of 21st May 2008 on Ambient Air Quality and Cleaner Air for Europe[1];
- Air Quality (England) Regulations 2000[2];
- Air Quality (England) (Amendment) Regulations 2002[3];
- Air Quality Standards Regulations 2010[4];
- Air Quality Standards (Amendment) Regulations 2016;[5]

[1] Directive 2008/50/EC. Available online: [redacted]
[2] Air Quality (England) Regulations 2000. Available online: https://www.legislation.gov.uk/uksi/2000/928/contents/made
[3] Air Quality (England) (Amendment) Regulations 2002. Available online: https://www.legislation.gov.uk/uksi/2002/3043/contents/made
[4] Air Quality Standards Regulations 2010. Available online: https://www.legislation.gov.uk/uksi/2010/1001/contents/made
[5] Air Quality Standards (Amendment) Regulations 2016. Available online: https://www.legislation.gov.uk/uksi/2016/1184/contents/made

- Environment Act 2021[6]; and
- Environmental Targets (Fine Particulate Matter) (England) Regulations 2023[7].

National planning policy

- Overarching National Policy Statement for Energy (NPS EN-1) (2023)[8] – Section 5.2 details the planning policy for air quality, including guidance on undertaking the EIA.
- National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (2023)[9] – Section 2.10 gives specific consideration to solar development including the assessment of traffic and transport impacts.
- National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (2023)[10] which details issues relating to underground cables, in connection with soil and contamination, although predominantly dealing with overhead cables.
- National Planning Policy Framework (NPPF) (2023)[11] which includes several requirements and considerations of developments in relation to air quality. These provisions aim to guide local authorities and developers in addressing air quality issues within the planning process.

[6] Environment Act 2021. Available online: https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted
[7] Environmental Targets (Fine Particulate Matter) (England) Regulations 2023. Available online: https://www.legislation.gov.uk/uksi/2023/96/contents/made
[8] Department for Energy Security and Net Zero. (2023). Overarching National Policy Statement for Energy (EN-1). Available online: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1
[9] Department for Energy Security and Net Zero (2023). National Policy Statement for Renewable Energy Infrastructure (EN-3). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3
[10] Department for Energy Security and Net Zero (2023). National Policy Statement for Electricity Networks Infrastructure (EN-5). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5
[11] Ministry of Housing, Communities and Local Government and Department for Levelling Up, Housing and Communities (2023) National Planning Policy Framework. Available online: https://www.gov.uk/government/publications/national-planning-policy-framework--2

- The Clean Air Strategy 2019[12].The Air Quality Strategy for England, Scotland, Wales and Northern Ireland Volume 1[13].
- The Air Quality Strategy for England, Scotland, Wales and Northern Ireland Volume 2 [14].

Local planning policy

- Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021)[15], specifically Policy NE5 'Pollution, air quality and contaminated land'.
- Buckinghamshire Council Climate Change and Air Quality Strategy (2021)[16].

Guidance

- IAQM, Guidance of the Assessment of Dust from Demolition and Construction, v1.1 (2024)[17].
- Land-Use Planning and Development Control: Planning for Air Quality (Environmental Protection UK (EPUK) and IAQM, 2017)[18]; and
- Local Air Quality Management (LAQM) Technical Guidance (TG22) (Department for Environment, Food and Rural Affairs (Defra), 2022)[19].

[12] The Clean Air Strategy (2019). Available online: Clean Air Strategy 2019 - GOV.UK (www.gov.uk)
[13] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland Volume 1 Available online: Volume 1 (www.gov.uk)
[14] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland Volume 2 Available online: Volume 2 (www.gov.uk)
[15] Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021). Available online: https://buckinghamshire-gov-uk.s3.amazonaws.com/documents/Aylesbury_local_plan_L46JWaT.pdf
[16] Buckinghamshire Council Climate Change and Air Quality Strategy (2021). Available online: Climate Change and Air Quality Strategy | Buckinghamshire Council
[17] IAQM Guidance of the Assessment of Dust from Demolition and Construction (2024). Available online: [redacted]
[18] Environmental Protection UK and Institute of Air Quality Management (2017) Land-Use Planning and Development Control: Planning for Air Quality. Available online: [redacted]
[19] Department for Environment, Food and Rural Affairs (2022) Local Air Quality Management (LAQM) Technical Guidance (TG.22). Available online: https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf

- IAQM, A guide to the assessment of air quality impacts on designated nature conservation sites, v1.1 (2020)[20].

6.4. Study area

6.4.1. Based on the Institute of Air Quality Management (IAQM) construction dust guidance[21], the study area for the construction and decommissioning phase assessments for sensitive human receptors for earthworks and general construction activities is up to 250 m from the Site boundary, (see **Plate 6.1** below).

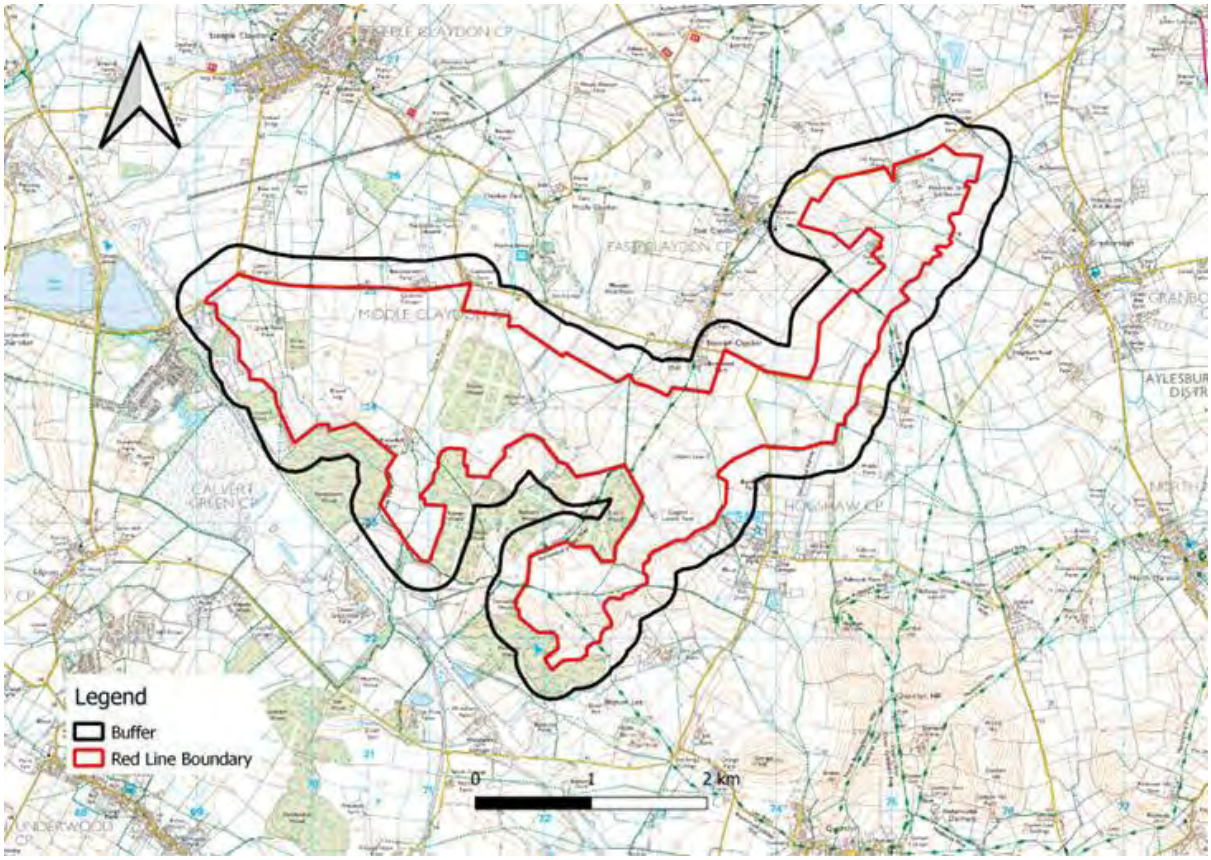

Plate 6.1: Construction dust study area

6.4.2. For trackout activities (which is defined as the transport of dust and dirt from the construction/demolition sites onto the public road network), the

[20] IAQM A guide to the assessment of air quality impacts on designated nature conservation sites (202). Available online: [redacted]

[21] Institute of Air Quality Management (2024) Guidance of the Assessment of Dust from Demolition and Construction (Version 2.2). Available online: [redacted]

study area is up to 50 m from the edge of the roads likely to be affected by trackout.

6.4.3. The study area for sensitive ecological receptors for earthworks and general construction activities is up to 50 m from the Site boundary and trackout.

6.4.4. Based on the IAQM impacts on designated nature conservation sites guidance[22], the study area for sensitive ecological receptors for road traffic impacts is 200 m for any road that will have a cumulative increase of 1000 Annual Average Daily Traffic (AADT).

6.4.5. The study area for the assessment of traffic exhaust emissions is determined by the roads predicted by the traffic assessment as likely to experience a significant change in traffic flows.

6.5. Establishing baseline conditions

6.5.1. A desk-based baseline air quality review has been undertaken to establish existing air quality conditions within the study area.

6.5.2. The following data sources have been used to understanding the existing air quality conditions:

- Buckinghamshire Council (2023) Air Quality Annual Status Report (ASR) (2023)[23];
- The Magic Map application available online from the Defra website[24]; and
- Estimated background air quality data from background maps published by Defra[25].

6.5.3. No surveys have been undertaken to inform the existing air quality conditions. No surveys are planned to be undertaken to inform the ES as publicly available data will be utilised.

6.6. Environmental baseline

6.6.1. Rosefield Solar Farm is located within the administrative area of Buckinghamshire Council. There are currently nine Air Quality

[22] IAQM A guide to the assessment of air quality impacts on designated nature conservation sites (202). Available online: [redacted]

[23] Buckinghamshire Council Air Quality Annual Status Report (2023). Available online: [redacted]

[24] Available online: https://magic.defra.gov.uk/magicmap.aspx

[25] Available online: https://uk-air.defra.gov.uk/

Management Areas (AQMAs) declared within this administrative area. However no AQMAs are located close to the Site; the closest AQMA is located in the neighbouring administrative area of Cherwell District Council in Bicester approximately 14 km from Rosefield Solar Farm.

6.6.2. Various small settlements (and therefore sensitive human receptors) are located close to Rosefield Solar Farm, of which Botolph Claydon is located within 250 m.

6.6.3. Rosefield Solar Farm is located is within 50 m of Sheephouse Wood and Finemere Wood Sites of Special Scientific Interest (SSSI) which are considered sensitive ecological receptors and the Ham Home-cum-Hamgreen Woods SSSI is located within 200 m of the A41.

6.6.4. According to the Buckinghamshire Council 2023 Air Quality ASR [26], there were two automatic monitoring stations and a network of 149 nitrogen dioxide (NO_2) diffusion tubes across the district in 2022. Particulate matter (PM) monitoring data is not available in the vicinity (within 3 km) of the approximate centre of the Site.

6.6.5. The nearest monitoring location is a NO_2 diffusion tube (Buckinghamshire Council ref: AV8 - 29 High Street, Winslow) situated approximately 7.5 km from the approximate centre of the Site. The measured annual average NO_2 concentrations at this diffusion tube site, for years 2017 - 2021, ranged between 23.0 µg/m^3 and 28.8 µg/m^3. These are well below the annual mean NO_2 air quality objective of 40µg/m^3.

6.6.6. Estimated background air quality data is available from the UK-AIR website operated by Defra[27]. The website provides estimated annual average background concentrations of NO_2, PM_{10} and $PM_{2.5}$ on a 1 km^2 grid basis from LAQM background maps. The estimated 2024 annual average background NO_2, PM_{10} and $PM_{2.5}$ concentrations at the Site are 6.7µg/m^3, 13.7µg/m^3 and 8.4µg/m^3, respectively, which are below the relevant air quality objectives (NO_2 air quality objective is 40µg/m^3; PM_{10} air quality objective is 40µg/m^3; and $PM_{2.5}$ air quality objective is 20µg/m^3). Overall, air quality is considered to be good within the study area.

6.6.7. With regards to the future baseline, the estimated annual average NO_2, PM_{10} and $PM_{2.5}$ background concentrations for 2026 from the UK-AIR website operated by Defra[28] are predicted to be 6.4 µg/m^3, 13.6 µg/m^3 and 8.3 µg/m^3 respectively. No exceedance of the annual average NO_2, PM_{10}

[26] Buckinghamshire Council Air Quality Annual Status Report (2023). Available online: [redacted]

[27] Available online: https://uk-air.defra.gov.uk/

[28] Available online: https://uk-air.defra.gov.uk/

and $PM_{2.5}$ air quality objectives are predicted. Background concentrations are predicted to fall with time because of the reduction in emissions to air resulting from newer technology vehicles (for example, improved engine performance, electric vehicles and improvement in fuel quality). Therefore background concentrations in future years are not expected to exceed their respective annual mean objectives.

Future baseline

6.6.8. Air quality across the study area in the absence of Rosefield Solar Farm is anticipated to remain largely unchanged from the levels in the current baseline conditions.

6.7. Mitigation embedded into the design

6.7.1. This preliminary assessment has been based on the principle that measures have been 'embedded' into the design of Rosefield Solar Farm to remove potential likely significant effects as far as practicable, for example by the considered placement of infrastructure. Embedded (primary) environmental mitigation measures that are considered to be an inherent part of Rosefield Solar Farm are detailed within **Chapter 5: Approach to the EIA**. The embedded mitigation measures relevant to air quality and the benefits these provide are outlined in **Table 6.1** below.

Table 6.1 – Embedded mitigation measures relevant to air quality

Embedded mitigation measures relevant to air quality	Benefit
There will be a minimum 250 m offset from the fence line around ITS, BESS, Rosefield Substation and Collector Compounds to residential properties, determined on a case by case basis. There will be a minimum 30 m offset from all fence lines within Rosefield Solar Farm to statutorily and locally designated wildlife sites. There will be a minimum 30 m offset from all fence lines within Rosefield Solar Farm to ancient woodland. There will be a minimum 10 m offset from all fence lines within Rosefield Solar Farm to all existing hedgerows.	Reduces risk of construction dust impacting on sensitive receptors during construction phase.
Construction traffic routes are planned to avoid passing sensitive villages and residential receptors where possible.	Reduces risk of trackout dust and vehicle emissions impacting on sensitive receptors.

6.8. Optionality

6.8.1. **Chapter 5: Approach to the EIA** sets out those elements of Rosefield Solar Farm for which optionality is present within the current design and sets out the scenarios assessed for the purpose of this PEIR.

6.8.2. The preliminary design principles as outlined in **Chapter 5: Approach to the EIA** and preliminary parameter plans (**Figures 3.1** to **3.5** in **Volume 2**) set out the reasonable 'worst case scenario' that has been assessed within this chapter. The 'worst case scenario' options in relation to this preliminary air quality assessment are described in **Table 6.2 below**.

Table 6.2 – Optionality scenarios assessed

Project element	Scenario assessed for this preliminary assessment
Satellite Collector Compounds	There are five fields that are considered suitable for Satellite Collector Compounds, as shown on the proposed Zonal Masterplan in **Figure 1.2** in **Volume 2** (Fields B10, B23, D8, D9 and D17). The preliminary assessment is based on the overall Site boundary and assumes impacts are consistent across the entire Site. The final positioning of the Satellite Collector Compounds would not impact the assessment and thus all locations have been considered for the purposes of this preliminary assessment.
Construction Compounds	Potential locations for the proposed Construction Compounds are outlined in **Figure 3.6** in **Volume 2**. The preliminary assessment is based on the overall Site boundary and assumes impacts are consistent across the entire Site. The final positioning of the Satellite Collector Compounds would not impact the assessment and thus all locations have been considered for the purposes of this preliminary assessment.
BESS	There are two scenarios outlined for the proposed location of the BESS in **Chapter 5: Approach to the EIA**. The proposed BESS are within Fields D8, D9 and E23 for both scenarios. The preliminary assessment will use the overall Site boundary and assume impacts are consistent across the entire Site. The final positioning of the BESS would not impact the assessment and thus all locations have been considered for the purposes of this preliminary assessment.
Rosefield Substation and Main Collector Compound	There are two scenarios outlined for the proposed location of the Rosefield Substation in **Chapter 5: Approach to the EIA**. Rosefield Substation will either be in Field E11 for Scenario 1, or the predominately northern area of Field E23 for Scenario 2. The preliminary assessment will use the overall Site boundary and assume impacts are consistent across the

Project element	Scenario assessed for this preliminary assessment
	entire Site. The final positioning of the Rosefield Substation would not impact the assessment and thus all locations have been considered for the purposes of this preliminary assessment.

Preliminary assessment assumptions

6.8.3. For the purposes of this preliminary assessment, it has been assumed that the construction phase of Rosefield Solar Farm will require a 'worst-case' daily trip generation of 218 Light Duty Vehicles (LDV) AADT trips and 144 Heavy Duty Vehicles (HDV) AADT trips. This is based on the 'worst case' month (month 4) of the construction period, and is not likely to be a reflection of the entire construction phase. It has been assumed that the decommissioning phase will be similar to the construction phase albeit with slightly shorter duration and fewer traffic movements.

6.9. Approach to the preliminary assessment

6.9.1. At this preliminary assessment stage, detailed construction and decommissioning activities and equipment lists have not been defined, and details to inform an assessment of dust emissions arising from construction and decommissioning activities are therefore not yet available to quantify impacts and their significance. A full assessment utilising significance criteria will be conducted and reported in the ES based on the methodology presented in **Appendix 6.1** in **Volume 3**. However this preliminary assessment does provide commentary on potential significant effects of likely anticipated construction activities.

6.9.2. Although details of the decommissioning phase are not fixed at this stage, it is expected that the activities during the decommissioning phase will be similar in nature to the construction phase, albeit of a slightly shorter duration, with fewer road traffic movements and on-site equipment (as described in **Chapter 3: Description of Rosefield Solar Farm**). The decommissioning phase is therefore likely to cause a lesser impact than the construction phase. As such, the construction phase is considered to be the worst-case scenario for both construction and decommissioning phases in this preliminary air quality assessment.

6.9.3. The principal pollutants relevant to this preliminary assessment are considered to be NO_2, PM_{10} and $PM_{2.5}$. These are regarded as the most significant air pollutants released by vehicular combustion processes, or subsequently generated by vehicle emissions in the atmosphere through chemical reactions.

6.9.4. A screening level qualitative assessment for traffic exhaust emissions (construction phase only) has been undertaken as part of this preliminary

assessment with reference to EPUK and IAQM guidance[29], using professional judgement and by considering the following information that will form part of the final design of Rosefield Solar Farm, where available:

- The number of road traffic vehicles likely to be generated;
- The number and proximity of sensitive receptors to the Site and along the likely routes to be used by construction vehicles; and
- The likely duration and the nature of the construction activities undertaken.

6.9.5. **Table 6.3** below presents the EPUK-IAQM 2017 guidance screening criteria that have been used for the preliminary assessment of construction phase traffic exhaust emissions.

Table 6.3 – Indicative criteria for requiring an air quality assessment

The development will…	Indicative criteria to proceed to an air quality assessment
Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors	A change of LDV flows of: • More than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA; • More than 500 AADT elsewhere.
Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors.	A change of HDV flows of: • More than 25 AADT within or adjacent to an AQMA; • More than 100 AADT elsewhere.

6.9.6. Initial estimates of construction phase traffic generation AADT (two-way trips) for 2028 are presented in **Table 6.4**. 2028 represents a reasonable 'worst-case' year of assessment, as construction is scheduled to commence in 2028 and as traffic growth increases year on year and any percentage impacts would therefore reduce beyond 2028. LDV and HDV modelling data will be updated in the ES to demonstrate that the predicted number of HGV movements during the construction programme will be considered cumulatively with other existing development and/or approved development(s).

[29] Environmental Protection UK and Institute of Air Quality Management (2017) Land-Use Planning and Development Control: Planning for Air Quality. Available online: [redacted]

Table 6.4 – Construction phase traffic data

Road	Estimated 2028 construction traffic associated with Rosefield Solar Farm	
	LDVs (AADT)	HDVs (AADT)
A34	11	124
M40 North	11	8
M40 South	11	8
A41	33	140
A41 Bicester	109	140
A41 West	109	140
A41 East	109	5
Station Road	218	144
Snake Lane	218	144
Claydon Road	218	144
Granborough Road	74	83

6.10. Assessment of likely effects (without additional mitigation)

6.10.1. This section considers the effects that may arise during the construction, operation (including maintenance) and decommissioning phases of Rosefield Solar Farm in the absence of additional mitigation, taking into account the above embedded mitigation measures outlined in **Table 6.1** and assessing the reasonable worst case scenarios as outlined in **Table 6.2**.

Construction and decommissioning phases

6.10.2. Construction and decommissioning works have the potential to release dust including fine particulate matter impacting air quality at nearby sensitive human and ecological receptors (e.g. residential properties, ancient woodland and Local Wildlife Sites) within the study area. The operation of Site construction equipment and machinery would result in emissions to the atmosphere of exhaust gases such as NO_2.

6.10.3. However, dust emitting activities can be effectively controlled by appropriate dust control measures and any adverse effects can be greatly reduced or eliminated. A dust risk assessment will be undertaken within the ES and will outline appropriate construction and decommissioning phase mitigation measures. With the implementation of these measures, construction dust impacts on sensitive ecological and human receptors are anticipated to be negligible.

6.10.4. Construction and decommissioning traffic would comprise haulage/construction vehicles and vehicles used for workers' trips to and from the Site. The greatest impact on air quality due to emissions from construction and decommissioning phase vehicles would be in areas

adjacent to the Site access and the nearby road network within the study area.

6.10.5. Initial construction traffic data, based on the worst-case month of the construction period, suggests that Rosefield Solar Farm would generate LDVs flows well below the EPUK-IAQM screening criterion[30] in **Table 6.3** (i.e. a change of LDVs of more than 500 AADT). However, it does suggest that Rosefield Solar Farm is likely to generate HDVs flows slightly exceeding the EPUK-IAQM screening criterion on some roads (being a change of HDVs of more than 100 AADT).

6.10.6. The A41 west is the only road that is within 200 m of a sensitive ecological site. The A41 will have a maximum impact of 249 additional AADT split into 109 LDVs and 140 HDVs. This is well below the 1000 AADT criterion for impacts to ecological sites (refer to **Table 6.3**) and therefore the impact is considered to be negligible.

6.10.7. Traffic effects during the construction phase would be limited to a relatively short period of approximately 30 months, and would occur along pre-designed traffic routes with few sensitive receptors. Baseline air quality is likely to be good and the annual mean NO_2 concentration within the study area is expected to be well below the air quality objective. Therefore it is considered likely overall that the additional traffic emissions as a result of the construction of Rosefield Solar Farm would not cause a significant adverse effect on local air quality.

6.10.8. Details of the decommissioning phase are not fixed at this stage. It is expected that the decommissioning phase would be similar in nature to construction, albeit of a slightly shorter duration, with fewer road traffic movements. It is therefore considered reasonable to assume that traffic impacts during the decommissioning phase would be the same as, or no greater than, the construction phase. Based on the temporary nature of the decommissioning activities and low background pollutant concentrations in the vicinity of the Site, it is considered that traffic exhaust emissions during the decommissioning phase would not result in a significant adverse effect on local air quality.

Operational (including maintenance) phase

6.10.9. Given the nature of Rosefield Solar Farm, no activities resulting in significant emissions are anticipated during the operational (including maintenance) phase. There would be only limited movement of vehicles to Rosefield Solar Farm for maintenance (as described in **Chapter 3:**

[30] Environmental Protection UK and Institute of Air Quality Management (2017) Land-Use Planning and Development Control: Planning for Air Quality. Available online: [redacted]

Description of Rosefield Solar Farm). Therefore the operational (including maintenance) phase of Rosefield Solar Farm is not considered further in this preliminary assessment.

6.11. Additional mitigation

Construction and decommissioning phases

6.11.1. Construction phase site-specific dust mitigation measures would be based on the results of the pre-mitigation dust impacts assessment (to be presented in the ES), which would also be applied for the decommissioning phase, where relevant.

6.11.2. Mitigation measures will be set out in an Outline Construction Environmental Management Plan and Outline Decommissioning Environmental Management Plan that will be submitted in support of the DCO application. This would also include general measures such as construction site management and machinery operation.

6.11.3. Any effects from traffic emissions on air quality would be temporary and can be suitably controlled by the employment of mitigation measures appropriate to Rosefield Solar Farm. Mitigation measures will be set out in an Outline Construction Traffic Management Plan that will be submitted in support of the DCO application. The route of construction traffic will be documented within the Construction Traffic Management Plan, including details and controls of road crossings by HDVs and minimising use of sensitive routes by HDVs.

6.12. Assessment of residual effects (with additional mitigation)

Construction and decommissioning phases

6.12.1. The residual effects of dust and PM emissions and exhaust emissions from construction equipment and machinery within the study area during the construction phase is likely to be temporary, and **not significant** for human and ecological receptors, provided that dust controls, site management and dust mitigation measures are applied as described in **Section 6.11**. Any residual effects on air quality within the study area during decommissioning would also be temporary and **not significant**, provided that dust controls, site management and dust mitigation measures are applied as described in **Section 6.11**.

6.12.2. The residual effect of traffic exhaust emissions during the construction and decommissioning phases of Rosefield Solar Farm within the study area is predicted to be **not significant**.

6.13. Opportunities for enhancement

6.13.1. Rosefield Solar Farm would produce a clean, sustainable energy source. Rosefield Solar Farm would help reduce the energy requirements from fossil fuels, which emit harmful air pollutants, such as carbon dioxide, NO_2, sulphur dioxide and PM. As a result, no further opportunities to enhance the environment from an air quality perspective have been identified at this stage.

6.14. Difficulties and uncertainties

6.14.1. The following difficulties and uncertainties have been encountered in undertaking this preliminary assessment:

- The information provided in this PEIR is preliminary and is based on the information available at the time of writing. A full assessment of likely significant effects will be reported in the ES.
- Details of plant/equipment during the construction and decommissioning phases of Rosefield Solar Farm have not been defined. The plant selection and programme will be defined during the preparation of the ES, as further information becomes available.

6.15. Further work required to inform the ES

6.15.1. To form a robust ES, the following work is proposed so that all aspects will be suitably considered:

6.15.2. Assessments of the likely significant effects of the dust and PM generated during the construction and decommissioning phases of Rosefield Solar Farm on sensitive receptors within the study areas will be undertaken having regard to IAQM 2024 guidance[31] and applying professional judgement. The full assessment will be detailed within the ES.

6.15.3. The IAQM 2024 guidance makes reference to the use of professional judgement when assessing the risks of dust impacts from construction and decommissioning activities. Owing to this, professional judgement will be used when determining whether a risk is considered to be significant or not for the purpose of the construction and decommissioning phase assessments.

6.15.4. The assessments will consider the risk of potential dust and PM effects from the following three sources: earthworks, general construction

[31] Institute of Air Quality Management (2024) Guidance of the Assessment of Dust from Demolition and Construction (Version 2.2). Available online: [redacted]

activities and trackout activities. They will take into account the nature and scale of the activities undertaken for each source and the sensitivity of the area to increases in dust and PM levels to assign a level of risk. **Table 6.5** and **Table 6.6** below indicate the scale of impact magnitude and the receptor sensitivity respectively that will be used in undertaking the construction and decommissioning phase assessments. Dust risks will be described in terms of low, medium or high as shown in **Table 6.6**. Once the level of risk has been ascertained, the site-specific mitigation proportionate to the level of risk will be identified. The assessments will determine the significance of any residual effects once any appropriate additional mitigation measures have been identified.

6.15.5. The criteria presented in **Table 6.5**, **Table 6.6** and **Table 6.7** are from the updated construction dust guidance was published by IAQM in January 2024[32] which supersedes the criteria presented in the EIA Scoping Report. The updated criteria which are set out below will be used to inform the detailed assessment for the ES.

6.15.6. A Plume Assessment to assess the impact of a fire event within the BESS battery components and an Outline Battery Safety Management Plan will be submitted in support of the DCO application.

Table 6.5 – Scale of magnitude for dust emission impacts

Activity	Magnitude	Description of activity/source
Earthworks	Large	Total site area >110,000 m^2, potentially dusty soil type (e.g. clay), >10 heavy earth moving vehicles active at any one time, formation of bunds >6 m in height.
	Medium	Total site area 18,000 – 110,000 m^2, moderately dusty soil type (e.g. silt), 5 – 10 heavy earth moving vehicles active at any one time, formation of bunds 3 m – 6 m in height.
	Small	Total site area <18,000 m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <3 m in height.
Construction	Large	Total building volume >75,000 m^3, on-site concrete batching, sandblasting.
	Medium	Total building volume 12,000 m^3 – 75,000 m^3, potentially dusty construction material (e.g. concrete), piling, on-site concrete batching.

[32] Institute of Air Quality Management (2024) Guidance of the Assessment of Dust from Demolition and Construction (Version 2.2). Available online: [redacted]

Activity	Magnitude	Description of activity/source
	Small	Total building volume <12,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber).
Trackout	Large	>50 HDV (>3.5 tonnes) trips in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m.
	Medium	20 – 50 HDV (>3.5 tonnes) trips in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m.
	Small	<20 HDV (>3.5 tonnes) trips in any one day, surface material with low potential for dust release, unpaved road length <50 m.

Table 6.6 – Scale of receptor sensitivity

Sensitivity of area	Dust soiling	Human receptors	Ecological receptors
High	Users can reasonably expect an enjoyment of a high level of amenity. The appearance, aesthetics or value of their property would be diminished by soiling. The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. Examples include dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms.	Locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day) Examples include residential properties, hospitals, schools and residential care homes. These should also be considered as having equal sensitivity to residential areas for the purposes of this preliminary assessment.	Locations with an international or national designation and the designated features may be affected by dust soiling. Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List for Great Britain. Examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.
Medium	Users would expect to enjoy a reasonable level of amenity but would not reasonably expect to enjoy the same level of amenity as in their home. The appearance, aesthetics or value of their property could be diminished by soiling.	Locations where the people exposed are workers and exposure is over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown. Locations with a national designation where the features

Sensitivity of area	Dust soiling	Human receptors	Ecological receptors
	The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. Examples include parks and places of work.	where individuals may be exposed for eight hours or more in a day). Examples include office and shop workers, but will generally not include workers occupationally exposed to PM_{10}, as protection is covered by Health and Safety at Work legislation.	may be affected by dust deposition. An example is a SSSI with dust sensitive features.
Low	The enjoyment of amenity would not reasonably be expected. Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling. There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. Examples include playing fields, farmland (unless commercially-sensitive) horticultural land, footpaths, short-term car parks and roads.	Locations where human exposure is transient. Indicative examples include public footpaths, playing fields, parks and shopping streets.	Locations with a local designation where the features may be affected by dust deposition. An example is a Local Nature Reserve with dust sensitive features.

Table 6.7 – Level of effects for dust emission impacts

Sensitivity of area		Dust emissions magnitude		
		Large	Medium	Small
Earthworks	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible
Construction	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible
Trackout	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible

7. Biodiversity

7.1. Introduction

7.1.1. This chapter presents a preliminary assessment of the likely significant effects arising from the construction, operation (including maintenance) and decommissioning of Rosefield Solar Farm upon biodiversity and should be read in conjunction with the following figures and appendices in **Volume 2** and **Volume 3**, respectively:

- **Figure 1.2: Rosefield Solar Farm Zonal Masterplan;**
- **Figure 3.4: Rosefield Solar Farm Landscape and Ecological Mitigation and Enhancements;**
- **Figure 3.6: Rosefield Solar Farm Indicative Locations Suitable for Main and Satellite Construction Compounds;**
- **Appendix 7.1: Preliminary Ecological Appraisal (2022);**
- **Appendix 7.2: Bat Preliminary Roost Assessment Report (2022);**
- **Appendix 7.3: Wintering Bird Survey Report (2022);**
- **Appendix 7.4: Breeding Bird Survey Report (2022);**
- **Appendix 7.5: Great Crested Newt Habitat Suitability Index and Environmental DNA Report (2023);**
- **Appendix 7.6: Badger Survey Report (2022) - Confidential Appendix;**
- **Appendix 7.7: Preliminary Ecological Appraisal (2024);**
- **Appendix 7.8: Otter and Water Vole Survey Report (2023);**
- **Appendix 7.9: Preliminary Aquatic Survey Report (2023);**
- **Appendix 7.10: Bat Activity Survey Report (2024);**
- **Appendix 7.11: Wintering Bird Survey Report (2024);**
- **Appendix 7.12: Breeding Bird Survey Report (2024);** and
- **Appendix 7.13: Stage 1 Arboricultural Report.**

7.2. Stakeholder engagement

7.2.1. **Table 7.1** provides a summary of the engagement undertaken to date to inform this preliminary assessment.

Table 7.1 – Engagement undertaken to date

Stakeholder	Date and method	Key matters discussed
Natural England	Teams call meeting on 14 September 2023	A high-level introduction to Rosefield Solar Farm that detailed the survey work completed to date, known constraints, current project principles and offsets embedded into the preliminary design and further survey work to be completed was provided. Natural England confirmed intent to designate a new Site of Special Scientific Interest (SSSI), the Bernwood SSSI, to include Sheephouse Wood SSSI, Finemere Wood SSSI Grendon and Doddershall Woods SSSI under one SSSI designation. The citation for Bernwood SSSI will also include Bechstein's bat (*Myotis bechsteinii*), a species which is currently not listed within the citations for the current SSSI designations. The Bernwood SSSI citation will also potentially include all the ancient woodland and agricultural land between the current SSSI designations to cover core roosting, foraging and commuting bat habitat; however this is still being confirmed by Natural England. Natural England advised they would like the Solar PV modules to be set back as far as possible from the SSSI designations and HS2 mitigation planting. They had concerns about Solar PV modules abutting Runts Wood and the surrounding of woodland. Natural England confirmed that they do not have a typical standoff distance, but they would recommend siting Solar PV modules away from woodland. In response to this, the Applicant amended the design of Rosefield Solar Farm to include buffer distances of at least 30 m from all fence lines within Rosefield Solar Farm to statutorily and locally designated wildlife sites. Natural England confirmed that there is a potential displacement effect to bats that will need to be considered, alongside the foraging risk and providing suitable buffer areas. Natural England also noted that consideration would also need to be given to the HS2 mitigation planting so that the benefits of this (both for bats and invertebrates) is not compromised. In response to this, the Applicant amended the design of Rosefield Solar Farm to include buffer distances of at least 20

Stakeholder	Date and method	Key matters discussed
		m from HS2 mitigation planting. Natural England's main concerns are the impacts on ecological designations, in-combination impacts with HS2, East West Rail and the Calvert waste site and Solar PV development in proximity to woodland, particularly around Parcel 1a which is known to be a key area for bats.
Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust	Teams call meeting on 3 November 2023	A high-level introduction to Rosefield Solar Farm was provided to Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust. Berkshire, Buckinghamshire and Oxfordshire Wildlife expressed concern about the proximity of the Site to ecological receptors, noting areas proposed for biodiversity mitigation did not reflect potential for reconnecting woodlands. The Applicant noted these were initial areas and the Project design would be revised to include larger mitigation areas and bigger offsets from woodlands and hedgerow at a more detailed design stage. In response, the Applicant amended the design of Rosefield Solar Farm to include buffer distances of at least 30 m from all fence lines within Rosefield Solar Farm to statutorily and locally designated wildlife sites, and at least 20 m from HS2 mitigation planting and other woodland areas to allow for high quality habitat creation to occur within these buffer areas. In addition, Solar PV modules have been removed from key locations including Parcel 1a, Knowl Hill (Field B17), half of Field B9, and the southern part of Parcel 2 (Fields D27 and D30 to D37).
Natural England	Teams call meeting on 22 February 2024	Meeting held to discuss updates to the zonal masterplan design, discuss scoping opinion comments raised by Natural England, overview of the results of bat activity surveys undertaken and further survey requirements, SSSI extension updates and high-level mitigation proposals. Natural England noted that the revised masterplan progress is heading in a positive direction, in particular the removal of a number of fields that Natural England had flagged previously as being of concern. However they were still concerned about the

Stakeholder	Date and method	Key matters discussed
		inclusion of Solar PV modules in Parcel 1a which have since been removed from the masterplan. Natural England is still progressing with the SSSI notification updates and therefore are still not able to share maps of the new SSSI boundary. No further comment was provided on scoping of surveys.
Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust	Teams call meeting on 21 May 2024	Meeting held to discuss updates to the zonal masterplan design and Outline Landscape and Ecological Management Plan. Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust advised they would likely be objecting to the proposals. An update on ecology surveys undertaken post-scoping was provided. The Applicant provided justification as to why invertebrate surveys, in particular for black hairstreak butterfly, were not proposed to be undertaken. Preliminary assessments have shown habitat within the Site boundary is suitable to support notable and protected invertebrate species and therefore their presence within the Site boundary was assumed. Mitigation was proposed to be incorporated into the design of Rosefield Solar Farm e.g., retention of woodland and hedgerows (other than for access) to ensure no loss of habitats suitable to support species. Overview of key offsets was provided to Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust, who requested justification for buffer distances be included within the impact assessment. Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust was offered the opportunity to attend a site visit. Mitigation and enhancement currently being proposed/considered was discussed and input from Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust into mitigation enhancements was welcomed by the Applicant. Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust advised biodiversity net gain (BNG) needs to be realistic as to what is achievable on Site, with

Stakeholder	Date and method	Key matters discussed
		justification provided along with detail of the proposed management and species mixes. The Applicant advised it is keen to work with Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust on the Bernwood Biodiversity Opportunity Area (BOA). Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust advocated for habitat creation to be managed and maintained in perpetuity after decommissioning. The Applicant advised there is only control over the land for 40 years during the operational (including maintenance) phase. Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust commented solar development in Fields D29 and D28 south of Runts Wood would likely result in isolation of woodland blocks in between. They noted buffers to provide connectivity for wildlife were located between Solar PV modules and the woodland edge, but would ideally want Solar PV modules removed for that section. Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust commented that the areas dedicated to ecological mitigation were looking promising and the design is heading in the right direction including the removal of fields within Parcel 1a from Solar PV development; however, they would like to see more mitigation areas throughout the Site. In response, the Applicant is looking to identify additional areas within the Site where further mitigation can be incorporated into the design. Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust noted that there is limited mitigation proposed in the northern area of the Site boundary, which is of lesser ecological importance. They would welcome additional mitigation in this location and for wider buffers adjacent to watercourses, given the Site is a key bat commuting area which Rosefield Solar Farm can help to link into the wider local landscape. Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust advised that the connections between Shrubs Wood and Sheephouse Wood are also key for bats, and that the mitigation areas located between these

Stakeholder	Date and method	Key matters discussed
		two woodland blocks need to be as large and diverse as possible.
Buckinghamshire Council	Via email 7 August 2024	The Buckinghamshire Council Ecology department have been contacted to discuss Rosefield Solar Farm. An initial meeting is scheduled to be held with the Council Ecology department in early September 2024 to discuss the survey work completed to date, known constraints, current project principles and offsets embedded into the preliminary design and further survey work to be completed.

7.2.2. The above engagement has informed the Applicant's approach to the scope of the design of Rosefield Solar Farm and the preliminary biodiversity assessment which is detailed in the relevant sections below.

7.3. Legislative framework, planning policy and guidance

7.3.1. The preliminary assessment has been undertaken with regard to the following legislation, planning policy and guidance.

Legislation

- The Conservation of Habitats and Species Regulations 2017 (as amended)[1];
- The Wildlife and Countryside Act 1981 (as amended)[2];
- The Countryside and Rights of Way Act 2000[3];
- The Environment Act 2021[4];
- The Natural Environment and Rural Communities Act 2006[5];

[1] Conservation of Habitats and Species Regulations 2017 (as amended). Available online: https://www.legislation.gov.uk/uksi/2017/1012
[2] Wildlife and Countryside Act 1981 (as amended). Available online: https://www.legislation.gov.uk/ukpga/1981/69
[3] Countryside and Rights of Way Act 2000. Available online: https://www.legislation.gov.uk/ukpga/2000/37/contents
[4] Environment Act 2021. Available online: https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted
[5] Natural Environment and Rural Communities Act 2006. Available online: https://www.legislation.gov.uk/ukpga/2006/16

- The Hedgerows Regulations 1997[6];
- The Protection of Badgers Act 1992[7];
- The Wild Mammals (Protection) Act 1996[8]; and
- The Invasive Alien Species (Enforcement and Permitting) Order 2019[9].

National Planning Policy

- Overarching National Policy Statement for Energy (NPS EN-1) (2023)[10] – reference to Section 4.6 discusses environmental and biodiversity net gain and Section 5.4 discusses impacts of energy infrastructure on biodiversity and geological conservation;
- National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (2023)[11] – specific reference to Section 2.10. Paragraphs 2.10.65 to 2.10.69 discuss project lifetime and decommissioning, as well as paragraphs 2.10.75 to 2.10.92 that discuss potential impacts to biodiversity and ecology from Solar PV generation projects. Paragraphs 2.10.128 to 2.10.130 discuss mitigation associated with biodiversity and ecological conservation for Solar PV generation projects. Paragraphs 2.10.154 to 2.10.156 discuss impacts to biodiversity and ecological conservation associated with Solar PV generation projects;
- National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (2023)[12] – reference to Section 2.5 that discusses environmental and biodiversity net gain as well as paragraphs 2.9.3 to 2.9.5 and

[6] The Hedgerows Regulations 1997. Available online: https://www.legislation.gov.uk/uksi/1997/1160/contents/made
[7] Protection of Badgers Act 1992. Available online: https://www.legislation.gov.uk/ukpga/1992/51/contents
[8] The Wild Mammals (Protection) Act 1996. Available online: https://www.legislation.gov.uk/ukpga/1996/3
[9] The Invasive Alien Species (Enforcement and Permitting) Order 2019. Available online: https://www.legislation.gov.uk/uksi/2019/527/contents/made
[10] Department for Energy Security and Net Zero (2023). Overarching National Policy Statement for Energy (EN-1). Available online: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1
[11] Department for Energy Security and Net Zero (2023). National Policy Statement for Renewable Energy Infrastructure (EN-3). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3
[12] Department for Energy Security and Net Zero (2023). National Policy Statement for Electricity Networks Infrastructure (EN-5). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5

2.10.2 to 2.10.4, which discuss biodiversity conservation, although focussed on overhead power lines;

- National Planning Policy Framework (NPPF) (2023)[13] with reference to Section 15 'Conserving and enhancing the natural environment', specifically paragraphs 180 to 194;
- A Green Future: Our 25 Year Plan to Improve the Environment[14];
- Environmental Improvement Plan 2023[15]; and
- Biodiversity 2020[16].

Local Planning Policy

- Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021)[17]
  - Policy NE1 Biodiversity and Geodiversity; and
  - Policy NE2 River and stream corridors.
- Forward to 2030: Biodiversity Action Plan (2023)[18]
  - Objective 1 - Retain, enhance, expand and create priority habitats everywhere, with a focus on BOAs and strategically-identified areas;

[13] Ministry of Housing, Communities and Local Government and Department for Levelling Up, Housing and Communities (2023). National Planning Policy Framework. Available online: https://www.gov.uk/government/publications/national-planning-policy-framework--2
[14] HM Government (2018). A Green Future: Our 25 Year Plan to Improve the Environment. Available online: https://assets.publishing.service.gov.uk/media/5ab3a67840f0b65bb584297e/25-year-environment-plan.pdf
[15] HM Government (2023). Environmental Improvement Plan 2023: First revision of the 25 Year Environment Plan. Available online: https://assets.publishing.service.gov.uk/media/64a6d9c1c531eb000c64fffa/environmental-improvement-plan-2023.pdf
[16] Department for Environment, Food and Rural Affairs (2020). Biodiversity 2020: A strategy for England's wildlife and ecosystem services. Available online: https://www.gov.uk/government/publications/biodiversity-2020-a-strategy-for-england-s-wildlife-and-ecosystem-services
[17] Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021). Available online: https://buckinghamshire-gov-uk.s3.amazonaws.com/documents/Aylesbury_local_plan_L46JWaT.pdf
[18] The Buckinghamshire & Milton Keynes Natural Environment Partnership (2023). Forward to 2030: Biodiversity Action Plan. Available online: [redacted]

- Objective 2 - Increase the overall land area of wildlife-important habitats and of land positively managed for wildlife and high nature value habitats;
- Objective 3 - Enhance existing habitats and improve habitat condition;
- Objective 4 - Create and manage buffers around existing and new areas of priority habitat and other core and high-quality biodiversity and habitat sites following best practice guidelines;
- Objective 5 - Connect quality habitats across the landscape to enable species movement across larger areas to improve habitat and species resilience to external pressures, with a focus on connectivity within and between BOAs as well as into the wider landscape;
- Objective 6 - Improve people's connectedness with nature, so that communities across Buckinghamshire and Milton Keynes value and understand the role of nature in mental and physical wellbeing; and
- Objective 7 - Ensure biodiversity is a key factor in the design of the urban environment and of new developments.

Guidance

- The Guidelines for Ecological Impact Assessment in the UK and Ireland[19].

7.4. Study area

7.4.1. The Study areas used for this preliminary assessment are set out in **Table 7.2**. Different Study areas have been used depending on the receptor assessed.

7.4.2. The surveys prior to 2024 (**Appendices 7.1** to **7.6** in **Volume 3**) were based on an earlier, reduced version of the Site boundary, which did not include the cable route search area. Since the Site boundary has been updated , further surveys have been undertaken to encompass the additional areas (including the cable route search area). Further survey work of Fields SA55,SA56, SA57, SA58 and SA59 is currently ongoing for all relevant receptors detailed in **Table 7.2** to inform the design of Rosefield Solar Farm, and once specific cable routes are identified, further surveys will be undertaken pre-construction where appropriate. In some instances, land access permission was not forthcoming and therefore an

[19] Chartered Institute of Ecology and Environmental Management (2022). Guidelines for Ecological Impact Assessment in the UK and Ireland, Terrestrial, Freshwater, Coastal and Marine (Version 1.2). Chartered Institute of Ecology and Environmental Management, Winchester.

assumption has been made regarding the suitability of these areas to support sensitive ecological receptors.

7.4.3. The results of this survey work will be presented in the ES submitted in support of the DCO application. Notwithstanding this, the survey data collected to date forms a robust baseline in which to inform this preliminary assessment.

Table 7.2 – Biodiversity Study areas

Receptor	Study area
Statutory designated sites	A background data search for statutory designated sites has been completed within the Site boundary and up to 2 km from the Site boundary, extended to 10 km from the Site boundary for Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Ramsar sites.
Non-statutory designated sites	A background data search for non-statutory designated sites has been completed within the Site boundary and up to 2 km from the Site boundary.
Habitats	The survey Study area for the preliminary ecological appraisal of habitats comprises the Site boundary. The survey Study area for aquatic preliminary surveys are the watercourses and ponds located within the Site boundary and up to 25 m from the Site boundary.
Invasive species	The survey Study area for invasive species comprises the Site boundary.
Rare and notable arable (non-crop) plants	The survey Study area for rare and notable arable (non-crop) plants comprises the Site boundary.
Protected and noteworthy species	A background data search for protected and noteworthy species has been completed within the Site boundary and up to 2 km of the Site boundary.
Terrestrial invertebrates	The Study area for terrestrial invertebrates comprises the Site boundary.
Fish	The Study area for fish comprises the Site boundary.
Amphibians	The survey Study area for amphibians is the ponds and terrestrial habitat within the Site boundary and ponds within 500 m of the Site boundary.
Reptiles	The Study area for reptiles comprises the Site boundary.

Receptor	Study area
Bats	The survey Study area for bat activity surveys is the distinct land parcels: • Parcel 1; • Parcel 1a; • Parcel 2; and • Parcel 3. Preliminary ground level bat roost assessments were completed in 2022 before the current Site boundary was determined. This PEIR only reports on the findings of the surveys completed to date within the current Site boundary. Therefore the Study area for ground level bat roost assessments comprises the following areas: • Parcel 1 – excluding Fields B5, B13, B23 (north) and B23 (south); • Parcel 1a; • Parcel 2 – excluding Fields D4, D6, D7, D44, D45, D30, D31, D32, D33, D34, D35, D36 and D37; and • Parcel 3 – excluding Fields E20, E21, E22 and E23. In addition, trees within previous versions of the cable routes (all are located within the current cable route search area) and the following areas of woodlands outside of the Site boundary have also been subject to ground level roost assessment: Shrubs Wood, Decoypond Wood, woodland block north-west of Decoypond Wood, Sheephouse Wood, Romer Wood, Balmore Wood and Runt's Wood.
Water voles and otters	The survey Study area for otter and water vole are the watercourses and ponds located within Parcels 1, 1a, 2 and 3 and up to a 200 m buffer from the Parcel boundaries where access allowed.
Badgers	The survey Study area for badgers comprises the Site boundary and a 50 m buffer from the Site boundary. Badger surveys were undertaken in 2022 before the current configuration of the Site boundary was determined. This preliminary assessment only reports on the findings of the surveys completed to date within the current Site boundary. Therefore the Study area for badgers comprises the following within the Site boundary, and where access

Receptor	Study area
	allowed, the survey area was extended to 50 m beyond the Site boundary: • Parcel 1 – excluding Fields B5, B13, B23 (north) and B23 (south); • Parcel 1a; • Parcel 2 – excluding Fields D4, D6, D7, D44, D45, D30, D31, D32, D33, D34, D35, D36 and D37; and • Parcel 3 - excluding Fields E20, E21, E22 and E23. In addition, areas associated with previous versions of cable routes located within the current cable route search area were also subject to badger surveys.
Breeding bird surveys	The survey Study area for breeding bird surveys is the distinct land parcels: • Parcel 1; • Parcel 1a; • Parcel 2; and • Parcel 3.
Wintering birds	The survey Study area for wintering bird surveys is the distinct land parcels: • Parcel 1; • Parcel 1a; and • Parcel 2. Parcel 3 was surveyed in 2021-2022 (excluding Fields E20, E21, E22 and E23 which were subsequently added to the Site boundary). It was not possible to undertake wintering bird surveys within Parcel 3 in 2023-2024. Given the habitats located within Parcel 3 are of similar composition to the areas that were surveyed, they are considered likely to support a similar species assemblage.

7.5. Establishing baseline conditions

7.5.1. As outlined in **Table 7.2**, a background data search from Buckinghamshire and Milton Keynes Environmental Records Centre has been undertaken.

7.5.2. The following surveys have been undertaken to inform the biodiversity conditions:

- Preliminary Ecological Appraisal undertaken in September 2021 and February 2022 (See **Appendix 7.1**) in **Volume 3**;
- Bat preliminary roost assessment undertaken in March 2022 (See **Appendix 7.2** in **Volume 3**);
- Wintering bird surveys undertaken October 2021-March 2022 (See **Appendix 7.3** in **Volume 3**);
- Breeding bird surveys undertaken March-June 2022 (See **Appendix 7.4** in **Volume 3**);
- Great crested newt environmental DNA survey undertaken in May 2022 and April 2023 (See **Appendix 7.5** in **Volume 3**);
- Badger survey undertaken December 2021-March 2022 (**Appendix 7.6 Confidential Appendix**);
- Preliminary Ecological Appraisal undertaken in June, July, August, October 2023 and January and May 2024 (See **Appendix 7.7** in **Volume 3**);
- Hedgerows Regulations survey undertaken in June, July, August and October 2023 and January and May 2024 (See **Appendix 7.7** in **Volume 3**)
- Arable (non-crop) plant survey undertaken in June 2023 (See **Appendix 7.7** in **Volume 3**);
- River condition assessment survey undertaken in September 2023 (to inform the BNG assessment);
- Otter and water vole surveys undertaken in June and August 2023 (See **Appendix 7.8** in **Volume 3**);
- Aquatic preliminary surveys undertaken in June 2023 (See **Appendix 7.9** in **Volume 3**);
- Bat activity surveys undertaken July 2022-September 2023 (See **Appendix 7.10** in **Volume 3**);
- Wintering bird surveys undertaken November 2023-February 2024 (See **Appendix 7.11** in **Volume 3**);
- Breeding bird surveys undertaken March-July 2024 (See **Appendix 7.12** in **Volume 3**); and
- Arboriculture surveys undertaken April-June 2024 (See **Appendix 7.13** in **Volume 3**).

7.6. Environmental baseline

7.6.1. The baseline conditions described below relate to the Study areas explained within **Table 7.2**. The description does not include areas within the Site boundary yet to be surveyed. Surveys of these areas will be undertaken in 2024, the results of which will be presented in the ES.

7.6.2. The existing ecological baseline is based on both desk and field-based studies undertaken to date (see **Sections 7.4** and **7.5** above).

Statutory designated sites

7.6.3. There are no internationally protected statutory designated nature conservation sites within the Site boundary or within 10 km of the Site boundary.

7.6.4. There are no nationally protected statutory designated nature conservation sites within the Site boundary. There are three nationally protected statutory designated nature conservation sites within 2 km of the Site boundary. Initial discussions with Natural England have indicated that the boundary of the SSSIs listed below will be extended. It is not yet known whether this extension will include areas within the Site boundary:

- Sheephouse Wood SSSI – adjacent to Parcel 1 and 1a;
- Finemere Wood SSSI – adjacent to Parcel 2; and
- Grendon and Doddershall Woods SSSI - 1.36 km south-west of Parcel 1a.

7.6.5. In addition, whilst recognising that Ham Home-cum-Hamgreen Woods SSSI is located 3.2 km south-west of the Site boundary and therefore outside of the Study area, the impact risk zone boundary for this SSSI intersects with the Site boundary. The locations of these sites are detailed in **Volume 2, Figure 7.1**.

Non-statutory designated sites

7.6.6. One non-statutory designated site is located within the Site boundary, this being Bernwood BOA, which overlaps with Parcel 1, 1a and 2 and the cable route search area.

7.6.7. There are 22 non-statutory designated sites within 2 km of the Site boundary, namely 14 Local Wildlife Sites (LWS), five Biological Notification Sites (BNS), two Wildlife Trust Reserves (WTR) and one Biodiversity BOA.

7.6.8. Those outside the Site boundary but directly adjacent are:

- Shrub Woods LWS –adjacent to Parcel 1;
- Decoypond Wood LWS – west of Parcel 1;

- Romer Wood LWS – north-east of Parcel 1a;
- Runts Wood LWS – adjacent to Parcel 2;
- Finemere WTR – south of Parcel 2;
- Home Wood, Middle Claydon LWS – adjacent to cable route search area;
- Balmore Wood LWS - adjacent to cable route search area; and
- Greatsea Wood LWS – adjacent to cable route search area.

7.6.9. The remaining sites are:

- Calvert Railway Station LWS – 108 m west of Parcel 1;
- Calvert Jubilee WTR – 277 m west of Parcel 1;
- Calvert Jubilee Nature Reserve LWS – 277 m west of Parcel 1;
- Grendon and Doddershall Meadows LWS – 585 m west of the Site boundary;
- Area north-west of Calvert Brickworks BNS – 741 m west of Parcel 1;
- Track leading to railway BNS – 790 m south of Parcel 1a;
- Calvert Brick Pits, Great Moor Sailing Club LWS – 960 m west of Parcel 1;
- Redland Bridge, Steeple Claydon BNS – 1.35 km north of Parcel 1;
- Wood between Lawn Hill and Dunsty Hill LWS – 1.36 km south-west of Parcel 1;
- Grassland near Addington BNS – 1.37 km north-west of the Site boundary;
- Stonehill Lane LWS – 1.44 km south-east of cable route search area;
- Grendon Underwood Meadows LWS – 1.46 km south-west of Parcel 1a;
- Upper Ray BOA – 1.46 km south-east of Parcel 1a; and
- South Lake, Addington BNS – 1.62 km north-west of the Site boundary.

Other notable sites

7.6.10. No areas of ancient woodland are located within the Site boundary. 21 areas of ancient woodland are located directly adjacent to the Site boundary in multiple locations. These comprise ancient and semi-natural woodland and ancient replanted woodland parcels, located within Shrubs Wood, Sheephouse Wood, Home Wood, Romer Wood, Greatsea Wood, Decoypond Wood, Finemere Wood, Balmore Wood and Runt's Wood.

7.6.11. There are a further 32 areas of ancient woodland within 2 km of the Site boundary.

Habitats

7.6.12. The Site predominantly consists of agricultural fields (mostly arable with some grassland) interspersed with hedgerows, small woodland blocks, ponds and farm access tracks. Several minor watercourses run adjacent to the Site boundary, including the Claydon Brook and tributaries, alongside small field drains and ditches that run parallel to numerous field boundaries.

7.6.13. The following UK Habitat survey habitats and corresponding habitat code were recorded as present within, and adjacent to, the Site during the preliminary ecological appraisal surveys undertaken in 2023 and 2024 (see **Figure 7.2**in **Volume 3**):

- Cereal crops (c1c);
- Non-cereal crops (c1d);
- Other neutral grassland (g3c);
- Modified grassland (g4);
- Lowland mixed deciduous woodland (w1f);
- Other woodland; broad-leaved (w1g);
- Line of trees (w1g6);
- Mixed scrub (h3h);
- Bramble scrub (h3d);
- Reedbeds (f2e);
- Other wetlands (f2f);
- Buildings (u1b5);
- Artificial unvegetated, unsealed surface (u1c);
- Hedgerow (priority habitat) (h2a);
- Standing open water (r1) – ponds;
- Other rivers and streams (r2b); and
- Individual rural trees.

Invasive non-native species

7.6.14. The background desk study did not identify any records of invasive non-native floral or faunal species within the Site boundary. However the study did identify several invasive non-native floral species within 2 km of the Site boundary, comprising:

- Indian Balsam (*Impatiens glandulifera*);
- Canadian Waterweed (*Elodea canadensis*);
- Variegated Yellow Archangel (*Lamiastrum galeobdolon subsp. Argentatum*); and
- Wall Cotoneaster (*Cotoneaster horizontalis*).

7.6.15. The background desk study also identified several invasive non-native faunal species within 2 km of the Site boundary, comprising:

- Mandarin duck (*Aix galericulata*);
- Ruddy duck (*Tadorna ferruginea*);
- Barnacle goose (*Branta leucopsis*);
- Bar-headed goose (*Anser indicus*);
- Canada goose (*Branta canadensis*);
- Snow goose (*Anser caerulescens*);
- Ring-necked parakeet (*Psittacula krameri*);
- Black swan (*Cygnus atratus*);
- Zander (*Stizostedion lucioperca*);
- Wels catfish (*Silurus glanis*);
- Chinese water deer (*Hydropotes inermis*); and
- American mink (*Mustela vison*).

7.6.16. During the preliminary ecological appraisal surveys undertaken in 2023 and 2024, no evidence of invasive non-native species was identified within the Site boundary; however, a pond located 9 m from the cable route search area boundary was found to contain New Zealand Pigmyweed (*Crassula helmsii*),an invasive non-native species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

Plants

7.6.17. The background desk study returned one plant record within the Site boundary of Good-King-Henry (*Chenopodium bonus-henricus*), a species listed as vulnerable on the Red List conservation status of Great Britain. Several plant records were located within the areas of woodland adjacent to the Site.

7.6.18. The background desk study returned records of 21 notable plant species within 2 km of the Site boundary. This included true Fox-sedge (*Carex vulpina*), Juniper (*Juniperus communis*), Grape-hyacinth (*Muscari neglectum*), Tubular Water-dropwort (*Oenanthe fistulosa*) (species listed under Section 41 of the Natural Environment and Rural Communities Act

2006), Bluebell (*Hyacinthoides non-scripta*) (Wildlife and Countryside Act 1981 (as amended) Section 8) and Good-King-Henry.

7.6.19. During the preliminary ecological appraisal surveys undertaken in 2023, Bluebell was recorded within areas of woodland. No other notable plant species were recorded within the Site boundary.

Invertebrates

7.6.20. The background desk study identified records within the Site boundary for black hairstreak (*Satyrium pruni)*, white admiral (*Limenitis camilla*), white-letter hairstreak (*Satyrium w-album*) and brown hairstreak (*Thecla betulae*), which are butterfly species that are included within the citations for Sheephouse Wood SSSI and Finemere Wood SSSI.

7.6.21. The background desk study identified 143 records of protected or otherwise notable invertebrates within 2 km of the Site, including wood white (*Leptidea sinapis*), which is included within the citations for Sheephouse Wood SSSI and Finemere Wood SSSI.

7.6.22. During the preliminary ecological appraisal survey undertaken in 2023 and 2024, the majority of the habitats present within the Site were considered likely to support common assemblages of invertebrate species typical of arable field margins, hedgerows, woodland and scrub, and grassland habitats. The three butterfly species included within the citations for Sheephouse Wood SSSI and Finemere Wood SSSI will use both woodland and hedgerow margin habitat. The food source for black and brown hairstreak caterpillars, Blackthorn (*Prunus spinosa*), was recorded abundantly across the Site within hedgerows and woodland areas. Areas of standing and fallen deadwood were also noted throughout the Site which were considered suitable to support deadwood invertebrate species.

7.6.23. Species observed during the preliminary ecological appraisal surveys undertaken in June-August 2023 comprised:

- Cinnabar moth (*Tyria jacobaeae*);
- Marbled white (*Melanargia galathea*);
- Meadow brown (*Maniola jurtina*);
- Ringlet (*Aphantopus hyperantus*);
- Comma (*Polygonia c-album*);
- Gatekeeper (*Pyronia tithonus*);
- Small heath (*Coenonympha pamphilus*);
- Large white (*Pieris brassicae*);
- Small skipper (*Thymelicus sylvestris*);

- Small tortoiseshell (*Aglais urticae*);
- Large skipper (*Ochlodes sylvanus*); and
- Purple hairstreak (*Favonius quercus*).

7.6.24. Several yellow meadow ant (*Lasius flavus*) hills were also recorded within the Site boundary.

7.6.25. Natural England has released several reports in support of the Bernwood SSSI designation[20,21,22]. Invertebrate surveys undertaken within the Bernwood area have highlighted that the woodland areas, scrub and hedgerow habitats support a diverse range of important invertebrate species, including black hairstreak butterfly. The woodlands and hedgerows in the area make a significant contribution towards the maintenance of the local meta-population and colonies of black hairstreak butterfly, which are considered important in a national context.

Fish

7.6.26. No records of fish were identified within the Site boundary. However the background desk study identified records of five fish species within 2 km of the Site boundary, comprising spined loach (*Cobitis taenia*) (a species listed under Section 41 of the Natural Environment and Rural Communities Act 2006), bullhead (*Cottus gobio*), common carp (*Cyprinus carpio*) and the invasive non-native species wels catfish (*Silurus glanis*) and zander (*Stizostedion lucioperca*).

7.6.27. The Claydon Brook, along with several larger waterbodies, were considered to provide suitable habitat for supporting common fish species.

Amphibians

7.6.28. No records of amphibians were identified within the Site boundary. However the background desk study identified records of great crested newt (*Triturus cristatus*) within 2 km of the Site boundary. A total of eight

[20] Natural England (2023). Bernwood Area Invertebrate Surveys 2017-2021 NERR129. Available online: [redacted]

[21] Natural England (2023). Bernwood Invertebrate Surveys 2021. Saproxylic and Hymenoptera focused surveys in Ham Home-cum-Hamgreen Woods SSSI and Grendon and Doddershall Woods SSSI, Buckinghamshire. Available online: [redacted]

[22] Natural England (2024). A Survey of the Black Hairstreak Butterfly in North Buckinghamshire. The results of surveys of the distribution of Black Hairstreak, Satyrium pruni in a complex of woodlands in the Bernwood Area. Available online: [redacted]

great crested newt Natural England class survey licence returns between 2016-2017 were identified within Parcel 1, indicating that great crested newt were present.

7.6.29. The background desk study also identified records of common toad (*Bufo bufo*), common frog (*Rana temporaria*), palmate newt (*Lissotriton helveticus*) and smooth newt (*Lissotriton vulgaris*) within 2 km of the Site boundary.

7.6.30. The amphibian surveys undertaken in 2022 and 2023 identified 12 ponds within the Site and within 500 m from the Site boundary that had a confirmed positive presence of great crested newt environmental DNA.

7.6.31. The areas of woodland, grassland margins and hedgerows within the Site boundary were considered suitable to provide foraging, refuge and hibernation opportunities for amphibian species, including great crested newts.

Reptiles

7.6.32. No records of reptiles were identified within the Site boundary. The background desk study identified records of grass snake (*Natrix helvetica*), common lizard (*Zootoca vivipara*) and slow-worm (*Anguis fragilis*) within 2 km of the Site boundary.

7.6.33. Within the Site, most of the land comprised arable and modified grassland fields which are considered sub-optimal to support reptiles. Smaller areas of rough grassland and scrub habitats were considered to provide suitable sheltering and foraging habitat to support small numbers of common reptile species, but these were limited in extent.

Birds

7.6.34. The background desk study identified one record of priority bird species, the aquatic warbler (*Acrocephalus paludicola*), within the Site boundary.

7.6.35. The background desk study identified records of 147 priority bird species within 2 km of the Site included on the Birds of Conservation Concern Red and Amber Lists[23], UK priority species under Natural Environment and

[23] The Birds of Conservation Concern Red, Amber and Green lists categorise the UK's regularly occurring bird species according to their level of conservation concern. Although these listings confer no legal protection, they are useful in guiding conservation action for individual species when birds may be affected by plans or projects. Red list species are species considered to be of high conservation concern. Amber list species are species considered to be of medium conservation concern.

Rural Communities Act 2006 and Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), with multiple records identified adjacent to the Site boundary, predominantly within the areas of woodland.

7.6.36. A total of 59 bird species were recorded during wintering bird surveys undertaken between October 2021 and March 2022. Of these 59 bird species, 34 species met at least one of a range of criteria relating to conservation importance including species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). This included species such as little egret (*Egretta garzetta*), red kite (*Milvus milvus*), golden plover (*Pluvialis apricari*), peregrine falcon (*Falco peregrinus*), fieldfare (*Turdus pilaris*) and redwing (*Turdus iliacus*).

7.6.37. A total of 60 bird species were recorded during wintering bird surveys undertaken between November 2023 and February 2024. These included three species included on Annex 1 of the EC Birds Directive, 11 species included under Section 41 Species of Principal Importance of the Natural Environment and Rural Communities Act 2006, 12 species included on the Birds of Conservation Concern Red List and 18 species included on the Birds of Conservation Concern Amber List. The surveys identified that Parcels 1 and 2 were of greatest value to wintering birds.

7.6.38. A total of 57 species (including species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and Annex 1 of the EU Birds Directive) were recorded during the breeding bird surveys undertaken between March and June 2022. Of the 57 species recorded within the survey area, 49 were considered to be breeding, including one species on Annex 1 of the EU Birds Directive (red kite). Little egret is also listed on Annex 1 of the EU Birds Directive and was not identified as breeding within the survey area, but was recorded flying over the Site. Three species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) were confirmed to be holding breeding territories within the survey area or were thought to have probable/possible territories, comprising:

- Red kite;
- Hobby (*Falco Subbuteo*); and
- Barn owl (*Tyto alba*).

7.6.39. In addition, 13 species listed as a Priority Species in the UK were also confirmed to be holding breeding territories within the survey area or were thought to have probable/possible territories, comprising:

Green list species have stable or increasing populations and are not currently of conservation concern.

- Grey partridge (*Perdix perdix*);
- Cuckoo (*Cuculus canorus*);
- Marsh tit (*Poecile palustris*);
- Skylark (*Alauda arvensis*);
- Song thrush (*Turdus philomelos*);
- Spotted flycatcher (*Muscicapa striata*);
- House sparrow (*Passer domesticus*);
- Dunnock (*Prunella modularis*);
- Yellow wagtail (*Motacilla flava*);
- Bullfinch (*Pyrrhula pyrrhula*);
- Linnet (*Carduelis cannabina*);
- Yellowhammer; and
- Reed bunting (*Emberiza schoeniclus*).

7.6.40. Ten species included on the Birds of Conservation Concern Red List and 11 species included on the Birds of Conservation Concern Amber List were either confirmed to be holding breeding territories within the survey area, or were thought to have probable/possible territories:

7.6.41. A total of 73 bird species, up to 49 of which were breeding within the Site, were recorded were recorded during the breeding bird surveys undertaken between [redacted] and [redacted] Species recorded breeding, or potentially breeding, during the 2024 field surveys included two species included on Annex 1 of the EC Birds Directive comprising peregrine falcon and red kite, four species included on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), comprising barn owl, hobby, peregrine falcon and red kite.

7.6.42. In addition, 13 listed as a Priority Species in the UK were recorded breeding or potentially breeding during the 2024 field surveys comprising:

- Bullfinch;
- Cuckoo;
- Dunnock;
- Grasshopper warbler;
- Grey partridge;
- House sparrow;
- Linnet;
- Reed bunting;

- Skylark;
- Song thrush;
- Tree sparrow;
- Yellow wagtail; and
- Yellowhammer.

7.6.43. Eleven species included on the Birds of Conservation Concern Red list and 11 species included on the Birds of Conservation Concern Amber list.

7.6.44. Arable fields, hedgerows and scrub within Parcels 1 and 2 were of greatest value to breeding birds in 2024, with Parcel 2 supporting the greatest diversity of farmland bird species including grey partridge, hobby, tree sparrow and yellow wagtail. Parcel 3 supported a relatively narrow breeding bird assemblage including scarce breeding species such as grasshopper warbler, peregrine and yellow wagtail. Parcel 1a was of comparatively low value for breeding birds.

7.6.45. During the preliminary ecological appraisal surveys undertaken in June-August 2023 and May 2024, the areas of woodland and hedgerow within the Site were assessed as suitable for providing foraging and breeding opportunities for a range of breeding birds, in particular passerine species. The areas of grassland and arable field margins were considered suitable habitat for ground nesting species as outlined above. Foraging raptors were recorded frequently across the Site, including red kite and buzzard (*Buteo buteo*), and barn owl boxes were also recorded across the Site boundary.

Bats

7.6.46. The background desk study identified one record of Bechstein's bat within the Site boundary.

7.6.47. The background desk study returned multiple records of [redacted], foraging and commuting activity for 13 bat species and four groups that could not be identified to species level within 2 km of the Site boundary comprising:

- Bechstein's bat;
- Brandt's bat (*Myotis brandtii*);
- Serotine (*Eptesicus serotinus*);
- Leisler's bat (*Nyctalus leisleri*);
- Noctule bat (*Nyctalus noctule*);
- Daubenton's bat (*Myotis daubentonii*);
- Whiskered bat (*Myotis mystacinus*);

- Whiskered/Brandt's bat (*Myotis mystacinus/brandtii*);
- Natterer's bat (*Myotis nattereri*);
- Myotis species (*Myotis spp.*);
- Western barbastelle (*Barbastella barbastellus*);
- Common pipistrelle (*Pipistrellus pipistrellus*);
- Soprano pipistrelle (*Pipistrellus pygmaeus*);
- Nathusius's pipistrelle (*Pipistrellus nathusii*);
- Pipistrelle species (*Pipistrellus spp.*);
- Brown long-eared bat (*Plecotus auritus*); and
- Unidentified bat species (*Chiroptera*).

7.6.48. High concentrations of records were located within the woodland blocks adjacent to the Site boundary, including multiple records of Bechstein's bats located within Finemere Wood, Sheephouse Wood, Home Wood, Shrubs Wood and Decoypond Wood.

7.6.49. The preliminary bat roost survey undertaken in 2022 identified multiple trees [redacted] as having high and moderate potential to support roosting bats.

7.6.50. During the preliminary ecological appraisal surveys undertaken in 2023 and 2024 of the current Site boundary, multiple trees and woodland blocks were assessed as having potential to support roosting bats, as well as an old barn present on Site. The arable and modified grassland fields were assessed to be of limited value to foraging bats. The hedgerows, field margins, woodland and pond habitats were assessed as offering highly suitable foraging and commuting habitat.

7.6.51. Walked bat activity transect surveys were undertaken on four occasions between July 2022 and September 2023, with static automated bat detectors placed within each transect route on four occasions between September 2022 and September 2023.

7.6.52. Based on the bat activity recorded during the walked transect surveys and the static automated detector surveys undertaken between July 2022 and September 2023, the Site is considered to support an assemblage of at least ten bat species comprising common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, noctule, Leisler's, serotine, brown long-eared, barbastelle, Daubenton's bat and Myotis species that could not be identified to species level. There are six resident species of Myotis species in the UK, all with similar call characteristics, and therefore it is likely that the Myotis calls represent more than one species. From work carried out

for HS2[24], it is known that five species of Myotis are present within the vicinity of the Site boundary, comprising Bechstein's bat, whiskered bat, Brandt's bat, Daubenton's bat and Natterer's bats. This means the Site is considered likely to support an assemblage of 13 bat species.

7.6.53. The majority of activity recorded during the transects was of common pipistrelle bats across all Parcels, followed by soprano pipistrelle, in line with the relative abundance of these species as well as the relative detectability of their calls. Based on professional judgement, activity levels of all species recorded during the walked transects were generally low across the Site and all Parcels, with key areas of bat activity identified in the following locations:

- [redacted]

7.6.54. Activity by Myotis bats was recorded on 59 occasions in total during the walked transect surveys. Calls could not be separated to species level and therefore are likely to include registrations, amongst other Myotis bat species, of the Habitats Directive Annex II listed Bechstein's bat known to roost within Sheephouse Wood adjacent to [redacted] Myotis bat registrations were made at all of the automated static detector locations during each monitoring occasion, except for [redacted] (see **Figure 12** in **Appendix 7.10** in **Volume 3**).

7.6.55. Activity by the Habitats Directive Annex II listed barbastelle bat was recorded on three occasions during the walked transect surveys.

[24] Natural England (2024) The Bernwood population of Bechstein's Bats. A non-Technical Summary (NECR558). Available online: [redacted]

Barbastelle bat were confirmed, or possible registrations were made, at all automated static detector locations, although not during every monitoring occasion.

7.6.56. From work carried out for HS2, Natural England has concluded that the population of Bechstein's bat of the Bernwood area, whilst not in Favourable Conservation Status nationally, and whilst genetically and geographically isolated locally, is nonetheless 'stable and viable'. However the conservation status of the species could be threatened by expansion of built developments, habitat fragmentation and loss, and uncoordinated land management[24].

Hazel dormouse

7.6.57. The background desk study identified no records of hazel dormouse (*Muscardinus avellanarius*) within the Site boundary or within 2 km of the Site boundary.

7.6.58. During the preliminary ecological appraisal survey undertaken in June-August 2023 the areas of woodland within the Site were considered sub-optimal to support dormice. The majority of the woodland areas had a lack of diverse and dense understorey and limited amounts of Hazel (*Corylus avellana*), although other species used by dormice, including Oak (*Quercus* spp.), Bramble (*Rubus fruticosus*), Ash (*Fraxinus excelsior*), Birch (*Betula* spp.), and Hawthorn (*Crataegus monogyna*) were recorded. The hedgerows within the Site were considered to provide suitable habitat for dormice and provide connectivity to the wider landscape.

Otter and water vole

7.6.59. No records of otter (*Lutra lutra*) and water vole (*Arvicola amphibius*) were identified within the Site boundary. The background desk study identified records of otter and water vole within 2 km of the Site boundary.

7.6.60. During the otter and water vole surveys undertaken in June and August 2023 no signs of water voles were observed. The majority of watercourses and ditches present within the Site were dry and lacked substrate suitable for burrowing and emergent vegetation for foraging.

7.6.61. The Claydon Brook was considered suitable to provide commuting and foraging opportunities for otter, whilst woodland habitat could provide suitable resting or lying up opportunities. One otter couch, one spraint and one potential holt was recorded along the watercourse running along the eastern boundary of Parcel 3.

Badger

7.6.62. The background desk study identified multiple records of badger within [redacted] including records of [redacted] located within

the Site boundary. A review of previous reports identified multiple badger [redacted] located within and adjacent to the Site boundary including main, annex, subsidiary and [redacted]

7.6.63. During the preliminary ecological appraisal surveys undertaken in 2023 and 2024, habitats within the Site were noted as being potentially suitable for badger, comprising grassland, scrub, and woodland which together provide suitable foraging and resting opportunities for badgers. [redacted] were identified and multiple [redacted] and [redacted]

Other species

7.6.64. The background desk study identified records of polecat (*Mustela putorius*), brown hare (*Lepus europaeus*), European hedgehog (*Erinaceus europaeus*) and harvest mouse (*Micromys minutus*) within 2 km of the Site boundary. No records were identified within the Site boundary.

7.6.65. During the preliminary ecological appraisal surveys undertaken in June-August 2023, several brown hare and roe deer (*Capreolus capreolus*) were noted within arable field areas.

7.6.66. Habitats within the Site, including woodland, hedgerows and grassland, were considered suitable for European hedgehog. Hedgehogs occupy a range of lowland habitats with enough cover to allow nesting. The areas of woodland, hedgerows and grassland within the Site provide suitable foraging habitat for European hedgehogs, with the hedgerows providing connectivity to suitable habitat in the wider landscape. No evidence of European hedgehog was noted during surveys.

7.6.67. Polecat favour a range of habitat types including woodland and farmland habitats; these are present abundantly within the Site boundary. No evidence of polecat was noted during surveys.

7.6.68. Habitats suitable to support harvest mouse present within the Site included the hedgerows and areas of grassland around the arable field margins. No evidence of harvest mouse was noted during surveys.

Future baseline

7.6.69. In terms of the future baseline in the absence of Rosefield Solar Farm, the Site would likely remain in agricultural management. Long-term climatic predictions suggest that warmer, wetter winters and drier summers will become more frequent, with more extreme weather events likely. This may affect the type of crops grown and, when combined with climate change, may lead to an increase in the population and distribution of some species identified or currently absent, but conversely a decrease in other species. No significant changes to the baseline are envisaged in the short-term.

7.7. Mitigation embedded into the design

7.7.1. This preliminary assessment has been based on the principle that measures have been 'embedded' into the design of Rosefield Solar Farm to remove potential likely significant effects as far as practicable, for example by the considered placement of infrastructure. Embedded (primary) environmental mitigation measures that are considered to be an inherent part of Rosefield Solar Farm are detailed within **Chapter 5: Approach to the EIA**. The embedded mitigation measures relevant to biodiversity and the benefits these provide are outlined in **Table 7.3** below and are detailed and in **Figure 3.4** in **Volume 2**.

Table 7.3 – Embedded mitigation measures relevant to biodiversity

Embedded mitigation measures relevant to biodiversity	Benefit
A minimum 20 m offset from HS2 woodland planting (adjacent to Parcel 1) to the fence line of the Solar PV modules. A minimum 30 m offset from all fence lines within Rosefield Solar Farm to statutorily and locally designated wildlife sites (i.e. Sheephouse Wood SSSI). A minimum 30 m offset from all fence lines within Rosefield Solar Farm to Ancient Woodlands (i.e. Runts Wood). A minimum 20 m offset from all fence lines within Rosefield Solar Farm to existing woodlands. A minimum 10 m offset from all fence lines within Rosefield Solar Farm to existing hedgerows.	Significant buffer that allows for habitat creation to occur such as species-rich grassland, tree and scrub planting, and pond restoration. A buffer would help mitigate the displacement effect of Solar PV modules on foraging and commuting bats, avoid displacement effect from HS2 mitigation planting, as well as providing habitat suitable to support a range of species.
A minimum 10 m offset from all fence lines within Rosefield Solar Farm to existing ponds.	The offset will be of benefit by ensuring no ponds are lost to Rosefield Solar Farm.
A minimum 50 m offset from all fence lines within Rosefield Solar Farm to existing main [redacted]	The offset will ensure badger [redacted] are not impacted and badgers will not be disturbed during construction, operation (including maintenance) and decommissioning of Rosefield Solar Farm.

Embedded mitigation measures relevant to biodiversity	Benefit
Removal of fields in Parcel 1a (Fields C1, C2 and C3) from Solar PV development.	Removal of Fields C1, C2 and C3 in Parcel 1a from Solar PV development will allow for the creation of habitats such as species-rich grassland and scrub to occur. The habitat will provide a connective link between Sheephouse Wood and Romer Wood for commuting bats. This will also mitigate loss of ground-nesting bird habitat and create a nectar source for invertebrates which in turn provides a foraging resource for bats and bird species.
Removal of Knowl Hill (Field B17) and half of Field B9 from Solar PV development.	Removal of Field B17 and half of Field B9 from Solar PV development will allow for the creation of species-rich grassland to occur. This will mitigate loss of ground-nesting bird habitat and create a nectar source for invertebrates which in turn provides a foraging resource for bats and bird species.
Removal of fields in the southern part of Parcel 2 (Fields D27 and D30 to D37) from Solar PV development.	Removal of Fields D27 and D30 to D37 from Solar PV development will allow for the creation of species-rich grassland. This will mitigate loss of ground-nesting bird habitat and create a nectar source for invertebrates which in turn provides a foraging resource for bats and bird species.
Minimum offset of least 10 m either side of Main Rivers, and 6 m from ditches and ordinary watercourses, to all fence lines within Rosefield Solar Farm. Where crossing points are required over Main Rivers or ordinary watercourses, these will be designed to minimise effects on floodplain and any biodiversity interest associated with the watercourse.	Buffer that allows for habitat creation such as species-rich grassland, scrub and ponds which would help mitigate the displacement effect of Solar PV modules on foraging and commuting bats, as well as providing habitat suitable to support a range of species. Maintaining a minimum works buffer from watercourses should avoid disturbance to otters, which may be using them for foraging or commuting at night. The buffer will also reduce potential for significant pollution events that could impact freshwater habitats and associated species.

7.8. Optionality

7.8.1. **Chapter 5: Approach to the EIA** sets out those elements of Rosefield Solar Farm for which optionality is present within the current design and sets out the scenarios assessed for the purpose of this PEIR.

7.8.2. The preliminary design principles as outlined in **Chapter 5: Approach to the EIA** and preliminary parameter plans (**Figures 3.1** to **3.5** in **Volume 2**) set out the reasonable 'worst case scenario' that has been assessed within this chapter. The 'worst case scenario' options in relation to this preliminary biodiversity assessment are described in **Table 7.4** below.

Table 7.4 – Optionality scenarios assessed

Project element	Scenario assessed for this preliminary assessment
BESS	As stated in **Chapter 5**, for the purposes of the preliminary assessment, there are two scenarios for the BESS locations in conjunction with the Rosefield Substation. 1. Rosefield Substation in Field E11 and BESS units located in Fields D8, D9 and E23. 2. Rosefield Substation in Field E23 and BESS units located in Fields D8, D9 and E23. Scenario 2 has been considered the worst case-scenario for biodiversity given the position of the BESS in Scenario 2 being located within close proximity of important Myotis bat commuting routes. Therefore this has been assessed within this preliminary assessment (see **Figure 1.2** in **Volume 2**).
Balance of Solar System (BoSS)	As stated in **Chapter 5: Approach to the EIA**, the location of the BoSS has not yet been defined. This preliminary assessment assumes the BoSS to be located independently outdoors and use of that and central string inverters would be used, as this is considered to be the worst case scenario (see **Figure 1.2** in **Volume 2**).
Satellite Collector Compounds	As stated in **Chapter 5: Approach to the EIA**, it is anticipated that one Satellite Collector Compound will be required in both Parcel 1 and Parcel 2 (see **Figure 1.2** in **Volume 2**). A Satellite Collector Compound would be located in either of the below fields in Parcel 1: • Field B10 • Field B23 (South) Field B10 has been considered the worst case-scenario for biodiversity given the position of the Satellite Collector

Project element	Scenario assessed for this preliminary assessment
	Compound being located within close proximity of important Myotis bat commuting routes. Therefore, this has been assessed within this preliminary assessment. A Satellite Collector Compound would be located in either of the below fields in Parcel 2: • Field D8 • Field D9 • Field D17 All fields have been assessed within this preliminary assessment.
Main Collector Compound	As stated in **Chapter 5: Approach to the EIA**, there are four fields that are considered suitable for the Main Collector Compound, which are located in Parcel 3, as outlined in **Figure 1.2** in **Volume 2** and detailed below. • Field E23 • Field E22 • Field E21 • Field E20 All fields have been assessed within this preliminary assessment.
Main Construction Compounds	As stated in **Chapter 5: Approach to the EIA**, nine fields are being considered for the locations of the Main Construction Compounds, as indicated in **Figure 3.6: Indicative Construction Compounds** in **Volume 2**. It is anticipated that only one will be required within each Parcel. A Main Construction Compound would be located in either of the below fields in Parcel 1: • Field B23 (South) • Field B20 A Main Construction Compound would be located in either of the below fields in Parcel 2: • Field D7 • Field D8 • Field D9

Project element	Scenario assessed for this preliminary assessment
	A Main Construction Compound would be located in either of the below fields in Parcel 3: • Field E21 • Field E22 • Field E23 • Field SA50 All fields have been assessed within this preliminary assessment.
Satellite Construction Compounds	As stated in **Chapter 5: Approach to the EIA**, eight fields are currently being considered for the locations of the Satellite Construction Compounds as indicated in **Figure 3.6: Indicative Construction Compounds** in **Volume 2**. It is anticipated that only one will be required in each Parcel. A Satellite Construction Compound would be located in either of the below fields in Parcel 1: • Field B3 • Field B6 • Field B7 • Field B10 A Satellite Construction Compound would be located in the below field in Parcel 2: • Field D27 A Satellite Construction Compound would be located in either of the below fields in Parcel 3: • Field E10 • Field E11 • Field E20 All fields have been assessed within this preliminary assessment.
Cable route to connect the Solar PV Modules, BoSS, Collector Compounds, Rosefield	As stated in **Chapter 5: Approach to the EIA**, the indicative location of the main cable route between the Parcels and the potential routing options detailed below and presented in **Figure 3.2: Indicative Cable Route Locations** in **Volume 2**.

Project element	Scenario assessed for this preliminary assessment
Substation and BESS	• Option A – Indicative cable route to the north of Home Wood, connecting Parcel 1 and 2; or • Option B – Indicative cable route to the south of Home Wood, connecting Parcel 1 and 2. For the purposes of this preliminary assessment, Option B has been assessed as this is considered to be the worst case scenario.

7.9. Approach to the preliminary assessment

7.9.1. This preliminary assessment has been undertaken in accordance with CIEEM guidance[25], as summarised below. This is considered the best practice guidance for ecological impact assessment and differs from the standard methodology set out in **Chapter 5: Approach to the EIA**.

7.9.2. This preliminary assessment has comprised the following steps:

- Identify relevant ecological features (e.g. designated sites, habitats, species or ecosystems) that may be impacted;
- Determine the ecological importance of receptors using geographic frames of reference[26]; and
- Provide a scientifically rigorous and transparent assessment of the likely ecological impacts and resultant effects. Impacts and effects may be positive or negative.

7.9.3. Criteria that have been taken into account when determining significance comprise:

- Duration (short-term, medium-term or long-term);
- Permanence (permanent or temporary) and changes in significance (increase or decrease); and
- Reversibility - e.g. is the change reversible or irreversible, permanent or temporary.

[25] Chartered Institute of Ecology and Environmental Management (2022) Guidelines for Ecological Impact Assessment in the UK and Ireland, Terrestrial, Freshwater, Coastal and Marine (Version 1.2). Chartered Institute of Ecology and Environmental Management, Winchester.
[26] A combination of survey data, species specific guidance and professional judgement has been used to assign an appropriate ecological importance for each receptor, as per the CIEEM guidance.

7.9.4. The geographic frames of reference used for this preliminary assessment, to help determine the ecological importance of receptors in accordance with the CIEEM guidance, are as follows:

- International (i.e. Ramsar Sites, SACs and SPAs) (normally within the geographic area of Europe);
- UK or national;
- Regional;
- County;
- District; and
- Local (i.e. within approximately 5 km of the Site boundary).

7.9.5. The ecological importance of species populations is based on their size, recognised status (such as through published lists of species of conservation concern and designation of Biodiversity Action Plan (BAP) status) and legal protection.

7.9.6. When assigning ecological importance to species populations, the following has been considered: legal protection, distribution, rarity, population trends and population size. The assessment of ecological importance relies on the professional opinion and judgment of experienced ecologists, informed by relevant population information and scientific research.

7.9.7. When assigning ecological importance to plant communities, they have been assessed in terms of their intrinsic value, habitat for supporting protected species and for supporting plants species of nature conservation concern.

7.9.8. CIEEM guidance requires a clear statement as to whether or not an effect is significant and at what geographical scale, for example ‘significant at the national level’.

7.10. Assessment of likely effects (without additional mitigation)

Construction phase

7.10.1. There will be no direct land take from the designated sites located adjacent to the Site boundary, and it is not envisaged that construction activities are likely to have a direct adverse impact upon these sites. However, in the absence of additional mitigation, there may be temporary indirect adverse impacts, such as surface water pollution run-off and dust pollution.

7.10.2. No direct loss of priority habitats will occur during the construction phase. The embedded design principles include a minimum standoff distance from Solar PV modules and associated infrastructure from habitats

including woodland, trees, ponds, watercourses and hedgerows. Temporary small-scale loss of habitats including hedgerow, grassland and scrub habitats are likely to occur, which will be re-instated as part of the embedded design principles. There will be a long-term loss of arable and grassland habitat where infrastructure is to be located for the 40 year duration of the operational (including maintenance) phase of Rosefield Solar Farm. In the absence of additional mitigation there may also be temporary indirect adverse impacts from surface water pollution run-off and dust.

7.10.3. Modification of arable and grassland habitat will occur due to the placement of Solar PV modules, the embedded design habitat creation proposals underneath Solar PV modules, and ecology mitigation areas.

7.10.4. The embedded design principles include buffer distances from key habitats to minimise disturbance to protected and notable species. In the absence of additional mitigation there is still potential for disturbance and displacement from construction activities to occur to protected and notable species including invertebrates, great crested newt, otter and badger.

7.10.5. Disturbance to roosting, foraging and commuting bats could occur during the construction phase in the absence of additional mitigation. This is likely to cause a short-term adverse effect to bats for the duration of the construction phase.

7.10.6. During the construction phase, short-term displacement of breeding birds and wintering birds through the installation of Solar PV modules and associated infrastructure would occur if not undertaken during the correct time of year.

7.10.7. The Rosefield Solar Farm layout would result in the short-term loss of habitat suitable for breeding birds and wintering birds, as well as the likely disturbance to breeding birds and wintering birds within the habitat immediately surrounding the Site boundary. In the absence of additional mitigation, construction activities within the Site boundary are likely to have a short-term adverse impact on breeding and wintering birds.

Operational (including maintenance) phase

7.10.8. It is not envisaged that operational activities are likely to have direct or indirect adverse impacts to designated sites.

7.10.9. There are expected to be no additional adverse impacts on habitats during the operational (including maintenance) phase, over and above those impacts that would have occurred during construction, given areas of retained habitat such as woodland, hedgerows, ponds, watercourses, ditches and field margins would not be directly or indirectly impacted. The habitat directly underneath Solar PV modules and between the Solar PV modules is likely to be sown and managed as flower-rich grassland or

herbal leys rather than the arable farmland or grassland, which currently dominates the Site, and is of limited biodiversity value. This habitat change would be beneficial, even though shading from Solar PV modules may, to some extent, restrict the growth of plants directly beneath the Solar PV modules and, to a lesser extent, between the rows.

7.10.10. Displacement to foraging and commuting bats is considered likely during the operational (including maintenance) phase in the absence of additional mitigation, despite embedded mitigation measures (minimum 30 m offsets from ancient woodland, statutorily and locally designated wildlife sites, minimum 20 m offsets from HS2 woodland planting and other existing areas of woodland, and minimum 10 m offsets from hedgerows, ponds and Main Rivers) providing large areas of suitable bat foraging and commuting habitat. This is likely to cause a long-term adverse effect to foraging and commuting bats for the duration of the operational (including maintenance) phase.

7.10.11. The areas where embedded mitigation is incorporated into the design of Rosefield Solar Farm are to provide continued availability of habitat for ground nesting birds, as well as suitable habitat for wintering birds during the operational (including maintenance) phase, and to improve connectivity for bird species to other areas of suitable habitat in the wider landscape.

7.10.12. Given the sensitivity of the location of Rosefield Solar Farm, particularly commuting and foraging bats, the layout of Rosefield Solar Farm and embedded design principles have been deliberately designed to ensure the retention, creation and enhancement of habitats such as field margins, woodland, hedgerows, trees, ponds, watercourses, ditches through appropriate buffers. Along with retaining existing habitats wherever possible, the locations of mitigation areas have been chosen to ensure the connections between the existing SSSIs and ancient woodland adjacent to the Site would be enhanced. By creating species-rich grassland and arable margins along with scrub and tree planting. This will create a coherent ecological network that will link the Site to the wider landscape, supporting the movement of local wildlife, particularly bats. The creation of species-rich grassland will provide ground-nesting bird habitat and create a nectar source for invertebrates, which in turn provides a foraging resource for bats and bird species. A mosaic of scrub and grassland will improve foraging habitat for bats and provide habitat to support invertebrates. Restoration of defunct ponds will help to enhance the pond network in the area, provide additional bat foraging habitat and support great crested newts. In addition, these habitats will also be of benefit to species including invertebrates, amphibians, reptiles, non-ground nesting birds, roosting bats, badger and otter. The locations of habitat creation proposals are detailed in **Figure 3.4** in **Volume 2**.

Decommissioning phase

7.10.13. The likely effects of the decommissioning phase on species within the Site boundary are expected to be similar to those for the construction phase. However given the proposed embedded mitigation measures to improve the ecological value of fields within the Site boundary, the biodiversity uplift gained during the operational (including maintenance) phase may be lost if fields are returned to agricultural use at decommissioning. Therefore the likely effects of the decommissioning phase on habitats may potentially be greater.

7.10.14. Appropriate measures will be put in place to minimise direct loss of habitat and disturbance during decommissioning.

7.11. Additional mitigation

Construction phase

7.11.1. Construction activities would be undertaken in accordance with the Outline Construction Environmental Management Plan that will be submitted in support of the DCO application. The Outline Construction Environmental Management Plan would be implemented by the principal contractor and relevant biodiversity elements would be overseen by an Ecological Clerk of Works where required. The Ecological Clerk of Works would be appointed to advise on protecting valued biodiversity features and provide practical, site-specific and proportionate advice on how to achieve compliance with environmental legislation during construction. The Outline Construction Environmental Management Plan will include measures such as best practices to control noise, light, vibration, and airborne and waterborne pollutants, and measures intended to avoid or minimise likely effects for designated sites, habitats and species.

7.11.2. Signage and security fencing around the works buffer zone will ensure that any works and construction traffic avoid the SSSI sites, non-statutory designated sites and ancient woodland sites.

7.11.3. Once the amount of hedgerow which needs to be removed to facilitate access and cabling is quantified, then an appropriate strategy will be documented within the Outline Construction Environmental Management Plan and the Outline Landscape and Ecological Management Plan.

7.11.4. The requirement for any construction/operational lighting to be designed sensitively to include directional, on demand lighting, infrared and directed away from hedgerows and trees will be documented within the Outline Construction Environmental Management Plan/Outline Operational Environmental Management Plan/Outline Decommissioning Environmental Management Plan, all of which will be submitted in support of the DCO application. A monitoring programme will ensure

implementation of mitigation measures, as will be documented within the Outline Construction Environmental Management Plan.

7.11.5. If any trees with bat roost potential cannot be avoided, e.g., for the cable installation or removal, these will be surveyed to determine presence/likely absence of a roost. Any loss of bat roosts will be mitigated and compensated under European Protected Species licences from Natural England which will be sought at the appropriate application stage. Loss of potential roosting features that are not confirmed as a bat roost will also be subject to a compensation strategy detailed within the European Protected Species licence.

7.11.6. Works with the potential to affect great crested newt would be carried out either under a District Level Licence through NatureSpace Partnership or under a European Protected Species licenced from Natural England. The licensable works would encompass clearance and construction works required within the intermediate and distant habitat zones of ponds (likely up to 250 m) within the Site boundary.

7.11.7. Pre-construction species surveys would be carried out, with details of the surveys to be undertaken defined in the Outline Construction Environmental Management Plan. The Outline Construction Environmental Management Plan will specify the Species Protection Plan documents to be detailed in the Construction Environmental Management Plan. The Species Protection Plans would be live documents subject to review and updating and would assist site personnel in the protection of species during construction, under the guidance of an Ecological Clerk of Works.

7.11.8. For mobile species such as badger, pre-construction surveys would be required to check the status of the [redacted] previously identified and to identify any new active [redacted] that would need to be protected. It is anticipated that badger [redacted] closure would not be required. Any exposed trenches or holes would be covered up when construction workers are off-site (i.e. at night-time) or stepped to allow any trapped badgers a safe exit. Should a newly established badger [redacted] be identified during the expected pre-construction surveys, construction works would cease in that location until appropriate mitigation measures were agreed with Natural England. Security fencing will not be dug into the ground, allowing badgers to push under the fence to forage as required.

7.11.9. All works in proximity to water bodies/watercourses would follow measures detailed within the Outline Construction Environmental Management Plan to ensure their protection against pollution, silting and erosion. No night-time working is envisaged (the period when otters are most active).

7.11.10. Whenever reasonably practicable, to minimise likely effects for breeding birds, clearance of vegetation of potential value to nesting birds (i.e. to facilitate access) would be completed outside of the bird-breeding season

(considered to be between mid-February and August, inclusive). Should it not be possible to avoid this season, vegetation would be inspected/surveyed by an Ecological Clerk of Works immediately before clearance (within 24 hours of clearance works). Any active nests would be given an appropriate disturbance buffer for that species with work only allowed to take place within this buffer once the Ecological Clerk of Works has confirmed any young have fully fledged and left the nest.

7.11.11. Should small-scale clearance of potential amphibian or reptile habitat or potential hibernacula features be necessary during the amphibian and reptile active season (late March/April to October inclusive, dependent on local weather conditions), vegetation would be cleared under a method statement secured through the Outline Construction Environmental Management Plan in a staged approach allowing any reptiles to move out of the way into adjacent retained habitat with vegetation cut to approximately knee height, then after 24 hours vegetation will be cut to ground-level. An Ecological Clerk of Works would supervise works and ensure precautionary measures are undertaken during works.

7.11.12. Proposed habitat retention and creation measures will be set out in the Outline Landscape and Ecological Management Plan to be submitted in support of the DCO application.

Operational (including maintenance) phase

7.11.13. Proposed habitat retention and creation measures would be set out in the Outline Landscape and Ecological Management Plan submitted in support of the DCO application. The Outline Landscape and Ecological Management Plan will include the principles of monitoring and management that would need to take place during the operational (including maintenance) phase of Rosefield Solar Farm.

7.11.14. An Outline Operational Environmental Management Plan will be submitted in support of the DCO application. It is proposed that the Outline Operational Environmental Management Plan includes the principles of the measures that would be required during maintenance work including, but not limited to, relevant species surveys that would need to be undertaken prior to any works and regular checks of deer-proof fencing to ensure no large mammals have become trapped.

Decommissioning phase

7.11.15. An Outline Decommissioning Environmental Management Plan will be submitted in support of the DCO application. The Outline Decommissioning Environmental Management Plan will include the principles of the measures that would be required to mitigate temporary loss of habitat or disturbance during decommissioning activities.

7.11.16. Updated habitat and species assessments may be required to inform the Outline Decommissioning Environmental Management Plan, completed in advance of decommissioning.

7.12. Assessment of residual effects (with additional mitigation)

7.12.1. This section brings together the information presented in the preceding sections of this chapter to consider the residual effects likely to be experienced by the receptors associated with Rosefield Solar Farm, detailed in **Table 7.5**. Using the significance criteria set out within the CIEEM guidance[27], the potential residual effects impacts related to each receptor have been characterised, following the implementation of the embedded mitigation measures (**Section 7.7**) and proposed additional mitigation measures (**Section 7.11**).

7.12.2. It is noted that a number of habitats support a range of species. These have been assessed as separate receptors in isolation of the fauna interest features, with species associated with the habitat type also assessed in isolation and not under the habitat types themselves.

Table 7.5 – Likely residual effects on biodiversity

Receptor	Likely residual effects following additional mitigation measures
Statutory designated sites (Sheephouse Wood SSSI, Finemere Wood SSSI, Grendon and Doddershall Woods SSSI and Ham Home-cum-Hamgreen Woods SSSI) Non statutory designated sites within/adjacent to the Site boundary (Bernwood BOA, Shrub Woods LWS, Decoypond Wood LWS, Romer Wood LWS, Runts Wood LWS, Finemere WTR, Home Wood, Middle Claydon LWS and Balmore Wood LWS)	Sheephouse Wood SSSI, Finemere Wood SSSI, Grendon and Doddershall Woods SSSI and Ham Home-cum-Hamgreen Woods SSSI are considered to be of **National** ecological importance. Bernwood BOA, Shrub Woods LWS, Decoypond Wood LWS, Romer Wood LWS, Runts Wood LWS, Finemere WTR, Home Wood, Middle Claydon LWS, and Balmore Wood LWS are considered to be of **County** ecological importance. Ancient woodland adjacent to the Site boundary is considered to be of **County** ecological importance. Lowland mixed deciduous woodland and other woodland; broad-leaved woodland are

[27] Chartered Institute of Ecology and Environmental Management (2022) Guidelines for Ecological Impact Assessment in the UK and Ireland, Terrestrial, Freshwater, Coastal and Marine (Version 1.2). Chartered Institute of Ecology and Environmental Management, Winchester.

Receptor	Likely residual effects following additional mitigation measures
Ancient woodland adjacent to the Site boundary Lowland mixed deciduous woodland and other woodland; broad-leaved woodland	considered to be of **County** ecological importance. The embedded design principles will include a minimum standoff distance from Solar PV modules and associated infrastructure from these sites. As a result, there will be no direct land take from these sites and it is not envisaged that construction or decommissioning activities are likely to have a direct adverse impact on the sites. The implementation of standard environmental protection measures during construction and decommissioning, such as dust suppression and pollution prevention, will be adopted and these measures will be documented within the Outline Construction Environmental Management Plan/Outline Decommissioning Environmental Management Plan. Security fences will ensure provision of buffers during construction and decommissioning works. Monitoring throughout works would ensure compliance and implementation of pollution prevention measures and buffers are maintained. Limited maintenance work during the operational (including maintenance) phase of Rosefield Solar Farm is anticipated. The areas where embedded mitigation is incorporated into the design of Rosefield Solar Farm that buffer these sites would be appropriately managed during the operational (including maintenance) phase, detailed within the Outline Landscape and Ecological Management Plan/Outline Operational Environmental Management Plan, and as such no residual adverse effects during the operational (including maintenance) phase are anticipated. Overall, given the embedded and additional mitigation measures relating to statutory sites, non-statutory designated sites and ancient woodland, residual effects are considered to be **not significant**.

Receptor	Likely residual effects following additional mitigation measures
Other ancient woodland sites within 2 km of Site Other 14 non-statutory designated sites within 2 km of Site	Other ancient woodland and non-statutory designated sites within 2 km of the Site boundary are considered to be of **County** ecological importance. The distance of these sites from Rosefield Solar Farm and a lack of relevant links or impact pathways between them and Rosefield Solar Farm, would result in no direct or indirect impacts anticipated at the construction, operational (including maintenance) and decommissioning phases. Therefore residual effects are considered to be **not significant**.
Hedgerows	The hedgerow resource is considered of **County** ecological importance. The embedded design principles will include a minimum standoff distance of 10 m from Solar PV modules and associated infrastructure from hedgerows to protect roots and branches during construction and decommissioning works. Rosefield Solar Farm has been designed to avoid hedgerow where practicable; however sections of hedgerow may need to be removed for underground cable installation/removal to widen internal access and create visibility splays at road access junctions. These will be replanted with like-for-like species as soon as practicable after construction/decommissioning. Control measures documented within the Outline Construction Environmental Management Plan/Outline Decommissioning Environmental Management Plan will safeguard protection against dust and soil pollution; security fences will ensure provision of hedgerow buffers and root protection zones of hedgerow trees during construction works. Hedgerows would be appropriately managed during the operational (including maintenance) phase, detailed within the Outline Landscape and Ecological Management Plan/Outline Operational Environmental Management Plan. Therefore residual effects during the operational

Receptor	Likely residual effects following additional mitigation measures
	(including maintenance) phase are not anticipated. Overall, the residual effect at the construction and decommissioning phase is predicted to be **adverse**, **short-term** and **temporary** at the **Local level** whilst reinstated sections of hedgerows become re-established. Given the hedgerow resource in the local area, this is deemed to be **not significant**.
Arable field margins	Arable field margins are considered to be of **Local** ecological importance. The embedded design principles will include a minimum standoff distance from Solar PV modules and associated infrastructure from arable field margins. As a result, there will be no direct loss of this habitat and it is not envisaged that construction/decommissioning activities are likely to have a permanent direct adverse impact. Limited maintenance work during the operational (including maintenance) phase of Rosefield Solar Farm is anticipated and arable field margins will be appropriately managed, as detailed within the Outline Landscape and Ecological Management Plan/Outline Operational Environmental Management Plan. Therefore, residual effects during the operational (including maintenance) phase are not anticipated. Overall, given the embedded and additional mitigation measures, residual effects are considered to be **not significant**.
Scrub	Scrub habitat is considered to be of **Local** ecological importance. Rosefield Solar Farm has been designed to avoid the removal of scrub habitat where practicable. However limited small-scale amounts of scrub habitat removal may be required. This would be temporary given the environmental mitigation measures that will be incorporated into the design of Rosefield Solar

Receptor	Likely residual effects following additional mitigation measures
	Farm, which will result in additional scrub habitat being planted. This will ensure the quantum of scrub habitat across the Site is maintained and will be appropriately managed during the operational (including maintenance) phase, as detailed within the Outline Landscape and Ecological Management Plan/Outline Operational Environmental Management Plan. Overall, given the embedded and additional mitigation measures, residual effects are considered to be **not significant**.
Grassland (modified grassland and other neutral grassland)	Modified grassland and other neutral grassland habitat are considered to be of **Local** ecological importance. Modified grassland and other neutral grassland habitat are extensive within the local area. Limited small-scale amounts of grassland habitat may be removed during construction to accommodate the cable route; however this will be short-term and temporary given the habitats would be re-instated on completion of works. Where Solar PV modules will be placed on areas of existing grassland, this will result in modification of the habitat due to shading and other effects. The environmental mitigation measures that will be incorporated into the design of Rosefield Solar Farm include seeding the areas beneath and adjacent to Solar PV modules with an appropriate species-rich grassland seed mix to improve grassland habitat. Limited maintenance work during the operational (including maintenance) phase of Rosefield Solar Farm is anticipated and grassland habitat will be appropriately managed either by low level grazing or hay cut at an appropriate time of year during the operational (including maintenance) phase, as to be detailed within the Outline Landscape and Ecological Management Plan/Outline Operational Environmental Management Plan.

Receptor	Likely residual effects following additional mitigation measures
	The residual effect at the construction phase is predicted to be **adverse, short-term** and **temporary** at the **Local level** and is deemed to be **not significant**. Overall, given the embedded and additional mitigation measures, at the operational (including maintenance) phase a **long-term, permanent** (for the duration of the operational (including maintenance) phase) **beneficial** residual effect is predicted, which would be **significant** at the **Local level**. The residual effect at the decommissioning phase is predicted to be **adverse**, **long-term** and **permanent** at the **Local level** and is deemed to be **significant** at the **Local level**.
Cereal and non-cereal crops	Cereal and non-cereal crops are considered to be of **Local** ecological importance. Cereal and non-cereal crop habitat is extensive within the local area. Where Solar PV modules will be located on areas of cereal and non-cereal crops, the environmental mitigation measures that will be incorporated into the design of Rosefield Solar Farm include seeding these with an appropriate herbal ley seed mix, resulting in cereal and non-cereal crop habitat being replaced with habitat that is of higher biodiversity value. No residual effects are identified at the construction/decommissioning phase. Overall, given the embedded and additional mitigation measures, at the operational (including maintenance) phase a **long-term, permanent** (for the duration of the operational (including maintenance) phase), **beneficial** residual effect is predicted which would be **significant** at the **Local level**.
Arable (non-crop) plants	Arable (non-crop) plants are considered to be of **Local** ecological importance. No notable arable (non-crop) plants were identified within the Site during baseline

Receptor	Likely residual effects following additional mitigation measures
	surveys. Therefore no residual effects are identified.
Individual trees and line of trees Watercourses Ponds Ditches	Individual trees and line of trees are considered to be of **Local** ecological importance. Watercourses are considered to be of **County** ecological importance. Ponds are considered to be of **County** ecological importance. Ditches are considered to be of **Local** ecological importance. The embedded design principles will include a minimum standoff distance from Solar PV modules and associated infrastructure of 10 m from trees, ponds, Main Rivers and ordinary watercourses and 6 m from ditches. As a result, there will be no direct loss of these habitats. The implementation of standard environmental protection measures during construction and decommissioning, will be documented within the Outline Construction Environmental Management Plan/Outline Decommissioning Environmental Management Plan. In addition, the embedded design principles will allow for the planting of trees and restoration of ponds. Limited maintenance work during the operational (including maintenance) phase of Rosefield Solar Farm is anticipated and these habitats will be appropriately managed during the operational (including maintenance) phase, as detailed within the Outline Landscape and Ecological Management Plan/Outline Operational Environmental Management Plan. Therefore residual effects during the operational (including maintenance) phase are not anticipated. Overall, given the embedded and additional mitigation measures, residual effects are considered to be **not significant**.
Invasive species	Invasive species are considered to be of **Local** ecological importance.

Receptor	Likely residual effects following additional mitigation measures
	No invasive species were identified within the Site boundary; however, a pond located 9 m from the cable route search area boundary was found to contain New Zealand Pigmyweed, an invasive non-native species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). An invasive species method statement will be implemented to prevent the accidental introduction of invasive species during the construction, operation (including maintenance) and decommissioning of Rosefield Solar Farm. This will be secured through the Outline Construction Environmental Management Plan/Outline Landscape and Ecological Management Plan/Outline Operational Environmental Management Plan/Outline Decommissioning Environmental Management Plan. Overall, given the embedded and additional mitigation measures, residual effects are considered to be **not significant**.
Invertebrates	The invertebrate assemblage is considered to be of **National** ecological importance. Woodland habitats will be retained in their entirety, whilst boundary features within the Site will be mostly retained in their entirety. These features are of importance for notable invertebrate species. Although limited small-scale removals of hedgerow and scrub habitat could be required to facilitate access and underground cabling, there is not expected to be an overall loss of suitable habitat for these species as boundary features will be enhanced and other habitat creation works, such as species-rich grassland, scrub planting and hedgerow planting secured through the Outline Landscape and Ecological Management Plan, which will be of benefit to invertebrate species. The environmental mitigation measures that will be incorporated into the design of Rosefield Solar Farm would be appropriately managed during the operational (including maintenance)

Receptor	Likely residual effects following additional mitigation measures
	phase, as detailed within the Outline Landscape and Ecological Management Plan/Outline Operational Environmental Management Plan, and will improve habitat suitable to support invertebrate assemblages across the Site. Therefore residual effects during the operational (including maintenance) phase are not anticipated. The residual effect during the construction and decommissioning phase is predicted to be **adverse, short-term** and **temporary** at the **Local level** and **not significant**. Overall, given the embedded and additional mitigation measures, at the operational (including maintenance) phase a **long-term, permanent** (for the duration of the operational (including maintenance) phase), **beneficial** residual effect is predicted, which would be **significant** at the **Local level**.
Amphibians (including great crested newt)	Great crested newt population is considered to be of **County** ecological importance. Within the Site boundary, environmental DNA surveys have confirmed the presence of great crested newt. The embedded design principles will include a minimum standoff distance from Solar PV modules and associated infrastructure of 10 m from ponds. As a result, there will be no direct loss of great crested newt breeding habitat. The implementation of standard environmental protection measures during construction and decommissioning, will be documented within the Outline Construction Environmental Management Plan/Outline Decommissioning Environmental Management Plan. There is the potential for the loss of suitable terrestrial habitat suitable for great crested newt in the vicinity of these ponds. The environmental mitigation measures that are expected to be incorporated into the design of Rosefield Solar Farm (including restoration of defunct ponds and provision of species-rich grassland and scrub

Receptor	Likely residual effects following additional mitigation measures
	planting), which would be appropriately managed during the operational (including maintenance) phase, as detailed within the Outline Landscape and Ecological Management Plan/Outline Operational Environmental Management Plan. This habitat has the potential to significantly improve great crested newt terrestrial habitat across the Site. In addition, the restoration of defunct ponds will increase the amount of breeding habitat available. Therefore residual effects during the operational (including maintenance) phase are not anticipated. Mitigation for any habitat loss during the construction, operational (including maintenance) and decommissioning phases will be dealt with through a District Level Licence or European Protected Species licence from Natural England. Overall, given the embedded and additional mitigation measures, residual effects are considered to be **not significant**.
Reptiles	Reptiles (if present) are considered to be of **Local** ecological importance. The Rosefield Solar Farm layout would result in the short-term loss of habitat suitable for reptiles during the construction/decommissioning phase. Removal of habitat suitable to support reptiles would be undertaken in a phased approach under a method statement secured within the Outline Construction Environmental Management Plan. Therefore residual effects during the construction/decommissioning phase are not anticipated. The mitigation measures that are expected to be incorporated into the design of Rosefield Solar Farm, including creation of species-rich grassland, arable margins and scrub habitat, which would be appropriately managed during the operational (including maintenance) phase, have the potential to significantly improve suitable reptile habitat across the Site. These measures will be detailed within the Outline

Receptor	Likely residual effects following additional mitigation measures
	Landscape and Ecological Management Plan/Outline Operational Environmental Management Plan. Therefore no residual effect on reptiles during the operational (including maintenance) phase is expected. Overall, given the embedded and additional mitigation measures, residual effects are considered to be **not significant**.
Ground nesting birds	The ground nesting bird assemblage is considered to be of **County** ecological importance. During the construction and decommissioning phases, displacement through disturbance due to the installation/removal of Solar PV modules and associated infrastructure would occur. Measures to safe-guard ground nesting birds during construction/decommissioning will be documented within the Outline Construction Environmental Management Plan/Outline Decommissioning Environmental Management Plan. Habitat creation to maintain nesting habitat for ground nesting birds and to increase the foraging habitat available will be documented within the Outline Landscape and Ecological Management Plan/Outline Operational Environmental Management Plan. The residual effect during the construction and decommissioning phases is predicted to be **adverse, short-term** and **temporary** at the **Local level** and **not significant**. Overall, given the embedded and additional mitigation measures, no residual effects are identified at the operational (including maintenance) phase.
Non-ground nesting birds	The non-ground nesting bird assemblage is considered to be of **County** ecological importance. During the construction and decommissioning phases, displacement through disturbance due

Receptor	Likely residual effects following additional mitigation measures
	to the installation/removal of Solar PV modules and associated infrastructure would occur. Measures to safe-guard non-ground nesting birds during construction/decommissioning will be documented within the Outline Construction Environmental Management Plan/Outline Decommissioning Environmental Management Plan. Rosefield Solar Farm has been designed to avoid hedgerow loss where practicable; however sections of hedgerow may need to be removed for underground cable installation/removal, to widen internal access and create visibility splays at road access junctions, resulting in a short-term loss of available nesting habitat. These will be replanted with like-for-like species as soon as practicable after construction/decommissioning. Habitat creation measures to maintain non-ground nesting bird habitat and to maintain foraging habitat available will be documented within the Outline Landscape and Ecological Management Plan/Outline Operational Environmental Management Plan. The residual effect at the construction and decommissioning phase is predicted to be **adverse, short-term** and **temporary** at the **Local level** and **not significant**. Overall, given the embedded and additional mitigation measures, no residual effects are identified at the operational (including maintenance) phase.
Wintering birds	The wintering bird assemblage is considered to be of **County** ecological importance. During the construction and decommissioning phases, displacement through disturbance due to the installation/removal of Solar PV modules and associated infrastructure would occur. Measures to safe-guard wintering birds during construction/decommissioning will be documented within the Outline Construction Environmental Management Plan/Outline

Receptor	Likely residual effects following additional mitigation measures
	Decommissioning Environmental Management Plan. Habitat creation to maintain foraging habitat for wintering birds, including species-rich grassland and arable field margins, will be documented within the Outline Landscape and Ecological Management Plan/Outline Operational Environmental Management Plan. The residual effect at the construction and decommissioning phase is predicted to be **adverse, short-term** and **temporary** at the **Local level** and **not significant**. Overall, given the embedded and additional mitigation measures, no residual effects are identified at the operational (including maintenance) phase.
Barn owl Red kite	Barn owl are considered to be of **County** ecological importance. Red kite are considered to be of **County** ecological importance. Measures to safe-guard barn owl and red kite during construction/decommissioning will be documented within the Outline Construction Environmental Management Plan/Outline Decommissioning Environmental Management Plan. Pre-construction surveys will be undertaken to confirm nesting locations within and adjacent to the Site boundary, with appropriate buffers maintained between nesting sites and construction/decommissioning activities to prevent disturbance and ensure legislation is adhered to. Habitat creation to maintain foraging habitat available will be documented within the Outline Landscape and Ecological Management Plan/Outline Operational Environmental Management Plan. Overall, given the embedded and additional mitigation measures, residual effects during the construction, operation (including maintenance)

Receptor	Likely residual effects following additional mitigation measures
	and decommissioning phases are considered to be **not significant**.
Bats (foraging and commuting)	Foraging and commuting bats are considered to be of **National** ecological importance, using areas of woodland as a roosting and foraging resource and using hedgerows, the intervening pasture and arable habitats for foraging and commuting. Construction/decommissioning activities which could potentially affect foraging and commuting bats include removal of hedgerows which may disrupt flight paths and lighting. During bat activity surveys, significantly more bat activity was found along hedgerows and field margins rather than in-field. The design of Rosefield Solar Farm has aimed to maintain landscape connectivity for bats. Hedgerows, trees, watercourses and ponds will be protected by a 10 m buffer and statutory designated sites, non-statutory designated sites and ancient woodland be protected by a 30 m buffer, HS2 mitigation planting and other woodland blocks will be protected by a 20 m buffer from Solar PV modules. Within these buffer areas, habitat creation such as species-rich grassland scrub and pond restoration will provide suitable foraging and commuting habitat for bats, and will be detailed within the Outline Landscape and Ecological Management Plan/Outline Operational Environmental Management Plan. Small sections of hedgerow may need to be removed for underground cable installation/removal, to widen internal access and create visibility splays at road access junctions, resulting in a short-term loss of available commuting and foraging habitat. These will be replanted with like-for-like species as soon as practicable after construction/decommissioning. Lighting proposals will be designed sensitively to include directional, on demand lighting and infrared (not visible to bats) and will be

Receptor	Likely residual effects following additional mitigation measures
	documented within the Outline Construction Environmental Management Plan/Outline Operational Environmental Management Plan/Outline Decommissioning Environmental Management Plan. Recent evidence[28][29][30] has indicated that some species of bat are (to an extent) displaced by solar arrays, although the exact mechanism causing the displacement, and over what distance the displacement effect occurs, is not known. In addition, disturbance as a result of operational noise from the BESS is considered likely, which will be confirmed This would constitute a permanent, long-term adverse effect for the duration of the operational (including maintenance) phase. Notwithstanding the embedded and additional mitigation measures, overall, the residual effect on commuting and foraging bats could result in a **direct**, **long-term, permanent** (for the duration of the operational (including maintenance) phase), **adverse effect** which would potentially result in a **significant** effect.
Bats (roosting)	Roosting bats are considered to be of **National** ecological importance, given that the Site is in close proximity to SSSIs that support nationally significant bat populations. Whilst presence/absence surveys have not been undertaken to date, a significant number of trees within and adjacent to the Site boundary have

[28] Tinsley E., Froidevaux J.S.P., Zsebok S., Szabadi K. L. and Jones G. (2023) Renewable energies and biodiversity: Impact of ground-mounted solar photovoltaic sites on bat activity. Journal of Applied Ecology. 00: 1-11.
[29] Szabadi K. L., Kurali A., Rahman N.A.A., Froidevaux J.S.P., Tinsley E., Jones G., Gorfol T., Estock P. and Zsebok S. (2023) The use of solar farms by bats in mosaic landscapes: Implications for conservation. Global Ecology and Conservation. 44.
[30] Barré K., Baudouin A., Froidevaux J.S.P., Chartendrault V,. and Kerbiriou C. (2023) Insectivorous bats alter their flight and feeding behaviour at ground-mounted solar farms. Journal of Applied Ecology.

Receptor	Likely residual effects following additional mitigation measures
	been assessed as having potential to support roosting bats. Embedded mitigation measures, including retention of such features, standoff distances from these features will be documented within the Outline Construction Environmental Management Plan/Outline Operational Environmental Management Plan/Outline Landscape and Ecological Management Plan/Outline Decommissioning Environmental Management Plan. If in the unlikely event that trees identified as having bat roost potential are required to be removed (e.g. to facilitate access or cable routes), the mitigation hierarchy will be used to avoid by design, where practicable, or else mitigate/compensate effect. Further targeted bat surveys, once access and cable route design has progressed, may be required to enable an informed assessment of likely effect on roosting bats. Compensation will be required for all potential roost features lost, not just those confirmed as bat roosts, to meet best practice. Mitigation for any loss of roosting habitat during the construction, operational (including maintenance) and decommissioning phases will be dealt with through European Protected Species licence from Natural England. Additional mitigation measures to include lighting proposals being designed sensitively to include directional, on demand lighting and infrared (not visible to bats) will be documented within the Outline Construction Environmental Management Plan/Outline Operational Environmental Management Plan/Outline Decommissioning Environmental Management Plan. Overall, given the embedded and additional mitigation measures, residual effects are considered to be **not significant**.
Otter	Otters are considered to be of **Local** ecological importance.

Receptor	Likely residual effects following additional mitigation measures
	To minimise disturbance to commuting and foraging otter during construction/decommissioning, appropriate buffers between the Site boundary and watercourses of 10 m and ditches of 6 m have been incorporated into the embedded design principles. A single potential holt is located along the boundary of Parcel 3. Pre-construction surveys will be undertaken to confirm active holts, with appropriate buffers maintained to prevent disturbance and ensure legislation is complied with. This will be documented within the Outline Construction Environmental Management Plan/Outline Decommissioning Environmental Management Plan. There are expected to be no additional adverse impacts on otter from Rosefield Solar Farm during the operational (including maintenance) phase, over and above those impacts that would have occurred during construction/decommissioning. Overall, given the embedded and additional mitigation measures, residual effects are considered to be **not significant**.
Badger	Badgers are considered to be of **Local** ecological importance. Construction/decommissioning activities within the Site boundary are likely to have a minimal impact on badgers as all currently known [redacted] are expected to be retained through appropriate buffers to prevent disturbance during construction. The buffer zones between construction/decommissioning activities and field boundaries will ensure badgers are able to freely move within the Site boundary without disturbance. In addition, any security fencing will not be dug into the ground so badgers will be able to push up under fencing to access fields to forage as they would do with normal stock fencing.

Receptor	Likely residual effects following additional mitigation measures
	Lighting proposals will be designed sensitively to include directional, on demand lighting and infrared and will be documented within the Outline Construction Environmental Management Plan/Outline Operational Environmental Management Plan/Outline Decommissioning Environmental Management Plan. There are expected to be no additional adverse impacts on badger from Rosefield Solar Farm during the operational (including maintenance) phase, over and above those impacts that would have occurred during construction. Overall, given the embedded and additional mitigation measures, residual effects are considered to be **not significant**.

7.13. Opportunities for enhancement

7.13.1. The following biodiversity enhancement opportunities have currently been identified:

- Installation of barn owl boxes in suitable retained trees within the Site boundary;
- Installation of bird nest boxes in suitable retained trees to increase the availability of nest sites for non-ground nesting birds within the Site boundary;
- Creation of amphibian and reptile hibernacula within suitable habitat within the Site boundary;
- Installation of bat roost boxes in areas of new planting, where trees will not yet have developed features suitable to support roosting bats; and
- Installation of artificial otter holts in suitable locations within the Site boundary.

7.13.2. All habitat creation and enhancement measures will be assessed in a Biodiversity Net Gain Assessment that will be submitted in support of the DCO application.

7.14. Difficulties and uncertainties

7.14.1. The following difficulties and uncertainties have been encountered in undertaking this preliminary assessment:

- The information provided in this PEIR is preliminary and is based on the information available at the time of writing. A full assessment of likely significant effects will be reported in the ES;
- The background data search provided by the Buckinghamshire and Milton Keynes Environmental Record Centre provided data with an accuracy between 100 m and 1 km. Therefore the interpretation of the background data has taken into account the location accuracy of the species records;
- Survey work of Fields SA55, SA56, SA57, SA58 and SA59 is currently ongoing for all relevant receptors detailed in **Table 7.2** to inform the design of Rosefield Solar Farm, and once specific cable routes are identified, further surveys will be undertaken pre-construction where appropriate. In some instances, land access was not possible and therefore an assumption has been made regarding these areas suitability to support receptors This will be presented in the ES submitted in support of the DCO application. Notwithstanding this, the survey data collected to date forms a robust baseline in which to inform this preliminary assessment;
- The ground level bat roost assessment survey conducted to date does not include all of the Site boundary. Therefore a final assessment cannot be made until further surveys are completed prior to the submission of the DCO application. Surveys will be determined on the location of specific works such as cable crossing points and access routes. The final impact assessment for bat roosts will be presented within the ES; and
- The badger surveys conducted to date do not include all of the Site boundary. Therefore a final assessment cannot be made until further badger surveys are completed prior to the submission of the DCO application. The final impact assessment for badgers will be presented within the ES.

7.15. Further work required to inform the ES

7.15.1. To form a robust ES, the following work is proposed so that all aspects will be suitably considered:

- Survey work of Fields SA55, SA56, SA57, SA58 and SA59;
- Bat preliminary roost assessment of areas not surveyed during 2022;
- Updated badger surveys of the Site boundary plus 30 m buffer including areas not surveyed during 2022;
- Further consultation with appropriate stakeholders will be undertaken to determine whether the data gathered to date, as well as proposed surveys, is sufficient to provide a full biodiversity assessment to inform the DCO application. Further consultation will also ensure any ecological

enhancements consider cumulative effects of other existing development and/or approved development; and

- A Biodiversity Net Gain assessment and calculation will also be undertaken to inform the design of Rosefield Solar Farm and will be submitted in support of the DCO application.

8. Climate

8.1. Introduction

8.1.1. This chapter presents a preliminary assessment of the likely significant effects arising from the construction, operation (including maintenance) and decommissioning of Rosefield Solar Farm upon climate and should be read in conjunction with the following appendix in **Volume 3**:

- **Appendix 8.1 – Climate Data Sources and Assumptions.**

8.2. Stakeholder engagement

8.2.1. Engagement with Buckinghamshire Council has been initiated to inform the ES; however, no specific consultation with regards to climate has been undertaken to inform this preliminary assessment.

8.3. Legislative framework, planning policy and guidance

8.3.1. One of the objectives of Rosefield Solar Farm is to mitigate against climate change, in order to align with relevant climate change legislation and planning policies, particularly with regards to the UK Climate Change Act 2008 (2050 Target Amendment) Order 2019[1], which is aligned with the goals of the 2015 Paris Agreement[2].

8.3.2. The preliminary assessment has been undertaken with regard to the following legislation, planning policy and guidance.

Legislation

- The 2015 Paris Agreement - this is a legally binding international treaty which commits Parties to the United Nations Framework Convention on Climate Change to objectives to reduce greenhouse gases (GHG) emissions, which include limiting the global average temperature rise to well below 2˚C above pre-industrial levels, whilst “pursuing efforts to limit the temperature increase to 1.5˚C”. It was adopted in December 2015, coming into effect November 2016;
- United Nations Framework Convention on Climate Change[3] - this came into force on 21 March 1994 and sought to stabilise the atmospheric

[1] Climate Change Act 2008. (2050 Target Amendment) Order 2019. Available online: https://www.legislation.gov.uk/ukdsi/2019/9780111187654
[2] The Paris Agreement 2015. Available online: [redacted]
[3] United Nations Framework Convention on Climate Change 1994. Available online: [redacted]

concentrations of greenhouse gases at safe levels. The Convention provides an overall framework for international government efforts to address the challenge posed by climate change;

- Kyoto Protocol[4] - this was an international treaty with the aim to reduce global GHG emissions. It was adopted in 1997 and came into force in 2005. It outlined six categories of GHG emissions weighted by their global warming potential and aggregated to give total greenhouse gas emissions in CO_2 equivalents. The Kyoto Protocol was effectively replaced by the Paris Agreement, which came into effect in 2016; and
- Climate Change Act 2008 (2050 Target Amendment) Order 2019[5] – sets a target of reducing GHG emissions by 100% by 2050 within the UK, relative to the baseline year of 1990. The Climate Change Act further established the Climate Change Committee as an independent, statutory body to advise the UK and devolved Governments on emission reduction targets and report to Parliament on progress. The Climate Change Committee is further tasked with the production of the UK Climate Change Risk Assessment, followed by a National Adaptation Programme to address those risks every five years, as well as undertaking an annual assessment of GHG emissions to determine whether the UK is on course to meet its target carbon budget.

National planning policy

- Overarching National Policy Statement for Energy (NPS EN-1) (2023)[6] - Section 3.3, sets out the importance of nationally significant energy infrastructure projects and explicitly includes solar generation within its scope. It recognises the urgent need for renewable technologies, such as Solar PV, in order to achieve net zero and ensure affordable energy security. Section 5.3 details the requirement for a GHG assessment as part of the Environmental Statement, to include construction, operation and decommissioning impacts. This must be used *"to drive down GHG emissions at every stage of the proposed development and ensure that emissions are minimised as far as possible for the type of technology"*. The impact of any residual GHG emissions and their impacts on national and international efforts to limit climate change must be detailed;

[4] Kyoto Protocol 1997. Available online: [redacted]

[5] Climate Change Act 2008 (2050 Target Amendment) Order 2019. Available online: https://www.legislation.gov.uk/ukdsi/2019/9780111187654

[6] Department for Energy Security and Net Zero. (2023). Overarching National Policy Statement for Energy (EN-1). Available online: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1

- National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (2023)[7] - Section 2.10 states that solar is important to deliver national energy security, and references the British Energy Security Strategy, whereby a five-fold increase in solar deployment is expected by 2035, up to 70 GW;
- National Policy Statement for Electricity Networks Infrastructure (EN-5) (2023)[8] references the consideration of whether a project makes a considerable contribution to the promotion of renewable energy, the achievement of climate change objectives and the maintenance of energy security. It references the requirements of NPS EN-1 to ensure the resilience to climate change is considered if applicable, with regards to flooding, wind, storms, increased heat and earth movement caused by flooding or drought;
- National Planning Policy Framework (NPPF) (2023)[9] presents several requirements and considerations related to climate change. Reducing GHG emissions, adapting to and avoiding areas subject to high climate risks (flooding, coastal risk, overheating) and enhancing resilience are implemented in planning systems. Examples include, reusing resources, using renewable energy, enhancing sustainable design, and incorporating green infrastructure. These provisions aim to guide local authorities and developers in addressing climate change issues within the planning process;
- British Energy Security Strategy (2022)[10] states that 95% of British electricity could be from low carbon sources by 2030, and by 2035, the electricity system will have been decarbonised. At the time of publication of this strategy, there was 14 GW of solar capacity within the UK, and it is anticipated that this figure could increase by up to five-fold by 2035, equating to 70 GW of solar capacity. Of this five-fold increase,

[7] Department for Energy Security and Net Zero (2023). National Policy Statement for Renewable Energy Infrastructure (EN-3). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3
[8] Department for Energy Security and Net Zero (2023). National Policy Statement for Electricity Networks Infrastructure (EN-5). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5
[9] Ministry of Housing, Communities and Local Government and Department for Levelling Up, Housing and Communities (2023). National Planning Policy Framework. Available online: https://www.gov.uk/government/publications/national-planning-policy-framework--2
[10] HM Government (2022). British Energy Security Strategy. Available online: https://assets.publishing.service.gov.uk/media/626112c0e90e07168e3fdba3/british-energy-security-strategy-web-accessible.pdf

Rosefield Solar Farm would contribute to approximately 1% of the UK's proposed solar capacity;

- Energy White Paper: Powering our Net Zero Future (2020)[11] outlines the UK's commitment to achieving net zero GHG emissions by 2050. It prioritises reducing carbon emissions through enhanced energy efficiency, technological innovation, and infrastructure investments. Examples include the introduction of smart tariffs to ensure affordable solar energy, which the net zero system will primarily be composed of. The policy also includes measures to support economic growth and job creation in the green sector while aligning with international climate agreements; and
- Powering Up Britain (2023)[12] highlights the expansion of renewable energy infrastructure and the modernisation of the energy grid to support increased renewable capacity in addition to improving energy efficiency improvements across buildings and transportation, and emphasising the role of technological advancements, such as hydrogen and carbon capture, in reducing emissions. This policy is designed to translate the broad goals of the Energy White Paper into actionable initiatives, ensuring that the UK meets its climate targets while fostering economic resilience and energy security.

Local planning policy

- Buckinghamshire Council Climate Change and Air Quality Strategy (2021)[13] – following up on Buckinghamshire's 2020 commitment to achieve carbon zero by 2050, this policy integrates air quality into the emissions reduction strategy. This document sets out the strategy for climate change mitigation/adaption and reducing air quality pollutants, which are also main sources of GHGs. The strategy details 60 actions involving Council operations, partner and supplier relations, and county activity influence. Emission reductions will be focused on the following sources: building and waste, air pollutant sequestration, absorption/screening, and flood risk management; and

[11] HM Government (2020). Energy White Paper: Powering our Net Zero Future. Available online: https://assets.publishing.service.gov.uk/media/5fdc61e2d3bf7f3a3bdc8cbf/201216_BEIS_EWP_Command_Paper_Accessible.pdf
[12] HM Government (2023). Powering Up Britain. Available online: https://assets.publishing.service.gov.uk/media/642468ff2fa8480013ec0f39/powering-up-britain-joint-overview.pdf
[13] Buckinghamshire Council Climate Change and Air Quality Strategy (2021). Available online: Climate Change and Air Quality Strategy | Buckinghamshire Council

- Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021)[14] – a 20-year sustainable development plan to be carried out between 2013-2033. There are eight objectives set out in Section 2.6, one of which is climate change adaptation and mitigation, largely focused on flood management. This objective also outlines sustainable and climate-adapted infrastructure, land use management, waste management and circular economy implementation, renewable energy, and wildlife corridors. Section 3.4 S1 states the requirement of developments to comply with the principles of sustainable development set out in the NPPF, and specifies considerations including S1(j)-meeting the effects of climate change and flooding. The relevance of renewable energy is detailed in Sections 10.51-10.60 and encouraging relevant developments in Section C3.

Guidance

- Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA, 2022)[15];
- Climate Change Resilience and Adaptation (IEMA, 2020)[16];
- PAS 2080 - Carbon management in Infrastructure (British Standards Institute (BSI), 2023)[17];
- Planning Practice Guidance on Climate Change (Ministry of Housing, Communities and Local Government and Department for Levelling Up, Housing and Communities, 2019)[18];

14 Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021). Available online: https://buckinghamshire-gov-uk.s3.amazonaws.com/documents/Aylesbury_local_plan_L46JWaT.pdf

15 Institute of Environmental Management and Assessment (2022). Assessing Greenhouse Gas Emissions and Evaluating their Significance. Available online: [redacted]

16 Institute of Environmental Management and Assessment (2020). Climate Change Resilience and Adaptation. Available online: [redacted]

17 British Standards Institute (2023). PAS 2080 - Carbon management in Infrastructure. Available online: [redacted]

18 Ministry of Housing, Communities and Local Government and Department for Levelling Up, Housing and Communities (2019). Planning Practice Guidance on Climate Change. available online: https://www.gov.uk/guidance/climate-change

- A Corporate Accounting and Reporting Standard (The Greenhouse Gas Protocol, 2004)[19]; and
- Whole Life Carbon Assessment for the Built Environment (Royal Institution of Chartered Surveyors (RICS), 2023)[20].

8.4. Study area

8.4.1. The sensitive receptor for GHG emissions is the global climate, which is considered highly sensitive to GHG fluctuations. By proxy, the sensitive receptor can also be extended to the UK's commitments under the UK Climate Change Act 2008 (2050 Target Amendment) Order 2019[21], which aligned with the goals of the 2015 Paris Agreement[22], to avoid dangerous climate change by limiting global warming to well below 2°C and pursuing efforts to limit it to 1.5°C.

8.4.2. Rosefield Solar Farm has the potential to affect the climate by the addition and avoidance of GHG emissions in comparison to the baseline and future baseline scenario.

8.4.3. The scope of the GHG assessment includes the addition of GHG emissions directly from construction, operational (including maintenance) and decommissioning activities undertaken within the Site boundary of Rosefield Solar Farm, including project fuel consumption (construction and decommissioning).

8.4.4. It also extends to include emissions that would occur outside the Site boundary, but related to the activities of Rosefield Solar Farm, including those from:

- The extraction, manufacture, and transportation of materials to the construction site (construction and operation (including maintenance));
- The transportation of workers to Site (construction and operation (including maintenance)); and

[19] The Greenhouse Gas Protocol (2004). A Corporate Accounting and Reporting Standard. Available online: [redacted]
[20] Royal Institution of Chartered Surveyors (2023). Whole Life Carbon Assessment for the Built Environment. Available online: [redacted]
[21] Climate Change Act 2008 (2050 Target Amendment) Order 2019. Available online: https://www.legislation.gov.uk/ukdsi/2019/9780111187654
[22] Paris Agreement 2015. Available online: [redacted]

- Off-site transport and disposal of waste materials (construction, operation (including maintenance) and decommissioning).

8.4.5. This preliminary assessment also considers the GHG savings from Rosefield Solar Farm as a result of displacing fossil-fuel based energy in the national electricity network.

8.5. Establishing baseline conditions

8.5.1. No surveys or site visits have been undertaken to inform the baseline conditions for climate.

8.5.2. Information concerning the baseline climactic conditions has been sourced from the Met Office (2024)[23], as well as UK Climate Projections 2018 (UKCP18) [24]. This information has been used to build a profile of climatic conditions in the project region.

8.6. Environmental baseline

GHG emissions

8.6.1. The land within the Site predominantly consists of agricultural fields, hedgerows and mature trees. In line with IEMA's (2022) 'Assessing Greenhouse Gas Emissions and Evaluating their Significance'[25], if a site currently has no development or significant activity, the baseline can be considered to have zero GHG emissions, to ensure a reasonable worst-case approach to establishing the net GHG effect.

8.6.2. While the Site is currently in agricultural use (associated emissions with vehicles and livestock), the emissions likely to be associated with these activities have not been considered to constitute significant activity.

Future baseline

8.6.3. No change is expected for the future baseline when compared to the current baseline. It is unlikely that under a future 'business-as-usual' scenario (wherein the land would remain used for its current purposes),

[23] Met Office (2024). UK Climate Averages. Available online: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/
[24] UK Climate Projections (2018). Available online: https://ukclimateprojections-ui.metoffice.gov.uk/ui/home
[25] Institute of Environmental Management and Assessment (2022). Assessing Greenhouse Gas Emissions and Evaluating their Significance. Available online: [redacted]

there would be any significant changes to the amount of GHG emissions from the Site, either positive or negative.

8.6.4. It is important to note that the UK's national grid is expected to decarbonise as a result of projected renewable energy developments, such as Rosefield Solar Farm. Therefore, Rosefield Solar Farm already forms part of the baseline assumption for future grid decarbonisation.

Climate change

8.6.5. The Met Office (2024)[26] climate profiles considered the region as *"essentially transitional between northern and southern England in terms of temperature and between Wales and eastern England as regards rainfall."*

8.6.6. The climate in the South East has been changing over the most recent decades, as shown in **Table 8.1** (which displays climate averages recorded from the nearest climate station to the Site, in this case Oxford). Temperature has increased across the decades studied, with an increase of 1.24˚C from the average annual maximum temperatures of 1961 – 1990 to those in 1991 – 2020 (standard industry practice is to define a regions' climate over a period of 30 years, which is also the method adopted by the Met Office). Rainfall has fluctuated across the decades studied, with the driest month experiencing an overall increase in rainfall of 3.21 mm and wettest month experiencing an overall increase in rainfall of 10.38 mm from 1961 – 1990 to 1991 – 2020.

Table 8.1 – Climate change in South East England since 1961

Climate variable	1961 – 1990	1971 – 2000	1981 – 2010	1991 – 2020
Average Annual Maximum Temperature (˚C)	13.78	14.13	14.57	15.02
Warmest Month Max Temperature (˚C)	21.73 (July)	22.33 (July)	22.72 (July)	23.06 (July)
Coldest Month Min Temperature (˚C)	1.39 (February)	1.73 (February)	1.83 (February)	2.32 (February)
Total Annual Rainfall (mm)	632.12	641.97	659.70	681.55

[26] Met Office (2024) Climate Profiles. Available online: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/weather/regional-climates/midlands_-climate-met-office.pdf

Climate variable	1961 – 1990	1971 – 2000	1981 – 2010	1991 – 2020
Rainfall in Driest Month (mm)	39.95 (February)	42.55 (February)	42.50 (February)	43.16 (March)
Rainfall in Wettest Month (mm)	62.80 (December)	64.67 (December)	69.64 (October)	73.18 (October)

Future baseline

8.6.7. Future climatic conditions are projected to change in comparison to the present baseline conditions. In particular, winters are projected to become increasingly warmer and wetter whilst summers are projected to become increasingly hotter and drier, as shown in **Table 8.2**, **Table 8.3** and **Table 8.4**.

8.6.8. Annually, atmospheric pressure at sea level is predicted to increase across the short to long-term time horizons, although there is much variation in terms of model outputs. High-pressure systems usually lead to fair, calm weather, and it may be expected that these conditions become more prevalent in the future. Though, as identified in **paragraph 8.6.10**, the frequency of winter storms may increase in line with projected windspeed changes.

8.6.9. The climate projections displayed in the following tables have been extracted from the UK Climate Projections 2018 (UKCP18)[27] data developed by the UK Climate Impacts Programme. The projections displayed in the tables below cover the indicative lifetime of Rosefield Solar Farm at the 50th percentile, with ranges shown for the 10th and 90th percentiles, for the Representative Concentration Pathway (RCP) 8.5 (high emissions) scenario. The figures are expressed as temperature/precipitation anomalies in relation to a 1981 – 2000 baseline.

8.6.10. UKCP18 projections do not contain specific outputs for windspeed changes for the UK. However, global projections of wind speed over the UK at 10 m height show no significant changes in the first part of the 21st century but predict increases in wind speed for the winter season from 2050 onwards. This would be associated with an increase in frequency of winter storms.

[27] UK Climate Projections (2018). Available online: https://ukclimateprojections-ui.metoffice.gov.uk/ui/home

Table 8.2 – Projected change in temperature in the South East England region (50th percentile with ranges for the 10th and 90th percentiles)

Climate variable	Time horizon relative to 1981 – 2000		
	2020 – 2039	2040 – 2059	2080 – 2099
Mean annual air temperature anomaly at 1.5 m (˚C)	+1.06 (+0.45 to +1.7)	+1.88 (+0.96 to +2.85)	+4.34 (+2.58 to +6.2)
Mean summer air temperature anomaly at 1.5 m (˚C)	+1.37 (+0.40 to +2.34)	+2.53 (+1.13 to +3.96)	+5.83 (+3.02 to +8.75)
Mean winter air temperature anomaly at 1.5 m (˚C)	+0.88 (+0.09 to +1.73)	+1.60 (+0.48 to +2.8)	+3.47 (+1.42 to +5.67)
Maximum summer air temperature anomaly at 1.5 m (˚C)	+1.51 (+0.2 to +2.8)	+2.79 (+0.95 to +4.71)	+6.46 (+2.87 to +10.21)
Minimum winter air temperature anomaly at 1.5 m (˚C)	+0.91 (+0.04 to +1.89)	+1.70 (+0.4 to +3.14)	+3.71 (+1.27 to +6.48)

Table 8.3 – Projected change in precipitation rate in the South East England region (50th percentile with ranges for the 10th and 90th percentiles)

Climate variable	Time horizon relative to 1981 – 2000		
	2020 – 2039	2040 – 2059	2080 – 2099
Annual precipitation rate anomaly (%)	+1.27 (-5.42 to +8.12)	-0.48 (-8.39 to +7.72)	-1.13 (-12.65 to +11.09)

Climate variable	Time horizon relative to 1981 – 2000		
	2020 – 2039	2040 – 2059	2080 – 2099
Summer precipitation rate anomaly (%)	-5.93 (-29.34 to +17.37)	-16.79 (-44.81 to +12.03)	-41.4 (-71.21 to +0.58)
Winter precipitation rate anomaly (%)	+8.06 (-4.59 to +21.95)	+12.56 (-3.86 to +31.56)	+26.01 (-1.69 to +59.79)

Table 8.4 – Projected change in sea level pressure in the South East England region (50th percentile with ranges for the 10th and 90th percentiles)

Climate variable	Time horizon relative to 1981 – 2000		
	2020 – 2039	2040 – 2059	2080 – 2099
Annual sea level pressure (hPa)	+0.28 (-0.65 to +1.25)	+0.63 (-0.57 to +1.8)	+0.83 (-1.21 to +2.84)
Summer sea level pressure (hPa)	+0.50 (-0.46 to +1.53)	+0.90 (-0.66 to +2.53)	+1.26 (-1.46 to +4.25)
Winter sea level pressure (hPa)	+0.01 (-2.01 to +2.06)	+0.09 (-2.43 to +2.71)	-0.45 (-4.87 to +3.84)

8.7. Mitigation embedded into the design

8.7.1. This preliminary assessment has been based on the principle that measures have been 'embedded' into the design of Rosefield Solar Farm to remove potential likely significant effects as far as practicable, for example by the considered placement of infrastructure. Embedded (primary) environmental mitigation measures that are considered to be an inherent part of Rosefield Solar Farm are detailed within **Chapter 5: Approach to the EIA**.

8.7.2. The embedded mitigation measures relevant to climate and the benefits these provide are outlined in **Table 8.5** below.

Table 8.5 – Embedded mitigation measures relevant to climate

Embedded mitigation measures relevant to Climate	Benefit
GHG emissions	
The use of concrete would be minimised where reasonably practicable.	Reduced embodied GHG emissions from concrete.
Any vegetation cleared to facilitate the construction of Rosefield Solar Farm will be compensated during operation by a planting scheme that equals or exceeds the current levels of vegetation.	The carbon sequestration potential of the Site will remain the same, or be enhanced, by Rosefield Solar Farm.
Climate risk	
Electrical infrastructure would be sited in locations at low risk of flooding and/or set at the necessary minimum ground levels.	Electrical infrastructure will be less likely to flood.
The condition and integrity of assets would be regularly assessed, and maintenance undertaken as early as required, giving consideration to materials with enhanced tolerance to fluctuating temperatures and exposure to rainfall.	Assets would be less likely to fail due to changes in climate.

8.8. Optionality

8.8.1. **Chapter 5: Approach to the EIA** sets out those elements of Rosefield Solar Farm for which optionality is present within the current design and sets out the scenarios assessed for the purpose of this PEIR.

8.8.2. The preliminary design principles as outlined in **Chapter 5: Approach to the EIA** and preliminary parameter plans (**Figures 3.1** to **3.5** in **Volume 2**) set out the reasonable 'worst case scenario' that has been assessed within this chapter.

8.8.3. Between the optionalities presented, there is no difference with regards to the Flood Zone any infrastructure is located in, nor is there any change in the number or capacity of the Solar PV modules.

8.8.4. For construction emissions assessed within this preliminary assessment, a worst case assumption of 30 months of peak construction has been assessed.

8.9. Approach to the preliminary assessment

GHG emissions

8.9.1. Data that has informed this preliminary assessment is provided in **Appendix 8.1** in **Volume 3**.

8.9.2. This preliminary assessment establishes present and future baseline GHG emissions. Aligned with The Greenhouse Gas Protocol[28], it quantifies applicable Kyoto Protocol[29] GHGs as measured in tonnes of carbon dioxide equivalence (tCO_2e), where equivalence means having the same warming effect as CO_2 over 100 years. The six original Kyoto Protocol gas groups are CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF_6) and perfluorocarbons (PFCs). Nitrogen trifluoride (NF_3), a chemical released in certain high-tech industries, was added in 2013. The global warming potential (GWP) of each is presented in **Table 8.6**.

Table 8.6 – Kyoto Protocol GHGs and their global warming potential (GWP) based upon Intergovernmental Panel on Climate Change's Fifth Assessment Report

Greenhouse gas/group	Chemical formula	GWP (CO2e)
Carbon dioxide	CO_2	1
Methane	CH_4	28
Nitrous oxide	$N2_O$	265
Hydrofluorocarbons	HFCs	Depends on specific gas
Sulphur hexafluoride	SF_6	23,900
Perfluorocarbons	PFCs	Depends on specific gas
Nitrogen Trifluoride	NF_3	16,100

[28] The Greenhouse Gas Protocol (2004). A Corporate Accounting and Reporting Standard. Available online: [redacted]
[29] Kyoto Protocol 1997. Available online: [redacted]

8.9.3. As this preliminary assessment represents a forecast of emissions and some information may not yet be known, secondary data (such as estimates, extrapolations, benchmarks, and proxy data such as distance travelled) have been used where applicable. Emissions have then been quantified by applying the most relevant and up-to-date emission factors. All supporting data used is available in **Appendix 8.1** in **Volume 3**.

8.9.4. An emission factor is a representative value that relates the quantity of a pollutant released into the atmosphere with an activity associated with the release of that pollutant. Emission factors are typically available from Government publications, independent agencies, and scientific research journals. However, the quality and accuracy of such factors can vary significantly. Factors can differ depending on the research body and/or underlying methodologies applied. It is, therefore, good practice to apply emission factors only from reputable sources, which is the methodology applied for this preliminary assessment.

8.9.5. The approach to this preliminary GHG assessment follows The Greenhouse Gas Protocol's[30] core principles:

- **Relevance**: selecting an appropriate inventory boundary that reflects the GHG activities of Rosefield Solar Farm and serves the decision-making needs of users;
- **Completeness**: accounting for all emission sources within the chosen inventory boundary, with any specific exclusions disclosed and justified;
- **Consistency**: aiming to collect meaningful and consistent data over time whilst transparently documenting any significant changes to data quality and/or format;
- **Transparency**: addressing all relevant issues in a coherent and clear manner; and
- **Accuracy**: minimising uncertainty and avoiding systematic over- or under-quantification of emissions, and ensuring any necessary estimates or assumptions required are conservative and guided by industry standards.

8.9.6. In line with The Greenhouse Gas Protocol[31] and IEMA's (2022) 'Assessing Greenhouse Gas Emissions and Evaluating their Significance'[32], a

[30] The Greenhouse Gas Protocol (2004). A Corporate Accounting and Reporting Standard. Available online: [redacted]
[31] The Greenhouse Gas Protocol (2004). A Corporate Accounting and Reporting Standard. Available online: [redacted]
[32] Institute of Environmental Management and Assessment (2022) Assessing Greenhouse Gas Emissions and Evaluating their Significance. Available online: [redacted]

materiality threshold of 1% may be set whereby emissions that are expected to contribute to less than 1% of the overall project emissions total may be excluded from the assessment.

Construction phase

8.9.7. The quantity of materials for Rosefield Solar Farm is based upon the information in **Chapter 3: Description of Rosefield Solar Farm**, alongside more specific product information (based on the design specification) and publicly available data (e.g., typical material composition of products), where required. This information has been used to estimate embodied emissions associated with material use.

8.9.8. Emissions from materials have been quantified by utilising One Click LCA (a life cycle assessment tool for calculating building and infrastructure whole life carbon emissions), scientific research papers, Environmental Product Declarations, Inventory of Carbon and Energy (University of Bath, 2019)[33] and Department for Energy Security and Net Zero's (2023)[34] conversion factors to use the most accurate densities and emission factors as possible.

8.9.9. Conversions between mass, volume and area have been calculated where appropriate to allow the application of specific emissions factors. Details of emission factors used have been included in **Appendix 8.1** in **Volume 3**. In addition, some material types, build ups, weights and dimensions have been based on publicly available information, where required (see **Appendix 8.1** in **Volume 3**).

8.9.10. To estimate construction fuel use, the following assumptions have been used, which are based upon previous project experience and data from similar developments:

- Plant and machinery would use 5,000 litres per week; and
- Generators would use 500 litres per week.

8.9.11. It should be noted that the above (**paragraph 8.9.10**) is based on the assumption that generators would run for six hours a day, 26 days a month over the 30-month construction period. This assumes peak construction over the 30-month construction period and is therefore considered to be a worst case for the purposes of this assessment

[33] University of Bath (2019). Inventory of Carbon and Energy. Available online: [redacted]

[34] Department for Energy Security and Net Zero (2023). Conversion factors. Available online: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023

8.9.12. To calculate emissions from the transportation of materials associated with the various elements of Rosefield Solar Farm, the expected continent of manufacture has been used to estimate delivery distances using guidelines published by RICS (2023)[35]. Where the source location was unknown, the location of manufacture has been estimated based on information provided by the Applicant and publicly available information. The quantification of transport emissions uses the tonne kilometre unit, equivalent to the transport of one tonne over one kilometre. The assessed components and source location are outlined below:

- Solar PV modules, frames, BESS, switchgear, transformers and inverters would be sourced from East Asia; and
- Foundations would be sourced from Europe.

8.9.13. Material wastage rates have been assumed based on RICS (2023), publicly available research[36] and previously consented projects.

8.9.14. Construction workers would be UK-based and assumed to have a one-way commuting distance of 50 km (100 km round trip) over the 30-month construction programme. This is based on experience of previously consented projects. The following assumptions have been applied (in line with the assumption outlined in the Transport Assessment **Appendix 14.1** in **Volume 3**):

- 70% of staff will arrive by minibus;
- 20% will arrive by van (car sharing for up to three staff); and
- 10% will arrive by car.

8.9.15. It is understood that during the peak construction phase, there would be 600 workers on-site per day.

8.9.16. It has also been assumed that construction workers would consume 45 litres of water per day, per person, during construction[37].

Operational (including maintenance) phase

8.9.17. Based on the grid connection offer for Rosefield Solar Farm, it is assumed for this preliminary assessment (and may be subject to change for the ES) that Rosefield Solar Farm will have an installed capacity of 340 MW, and

[35] Royal Institution of Chartered Surveyors (2023). Whole Life Carbon Assessment for the Built Environment. Available online: [redacted]

[36] Solar Builder 2022. Available online: [redacted]

[37] Building Services and Information Association, 2011

generation of 335,000 MW per hour (MWh) in the first year. A degradation factor of 0.4% has been applied each year to account for year-on-year reduction in yield.

8.9.18. To estimate emissions associated with the maintenance and replacement of Rosefield Solar Farm, the service life of the various assets has been tabulated below in **Table 8.7**. It should be noted that the service life of Rosefield Solar Farm is expected to be 40 years, at which point Rosefield Solar Farm would be decommissioned. Therefore, assets with a service life of 40 years or more would not require any replacement.

Table 8.7 – Service life of Rosefield Solar Farm components

Item	Service life (years)
Solar PV modules	40
Solar PV modules frames and foundations	40
BESS	20
BESS containers and Inverter containers	40
Inverters	10
Transformers	30
Switchgear	30
Rosefield Substation and security cabin	40

8.9.19. The emissions associated with the construction of Rosefield Substation has been modelled using One Click LCA software, and a 40-year service life has been applied. However, replacement and maintenance of individual parts/elements of Rosefield Substation would likely be required and is accounted for within the model. Therefore, there are some replacement emissions associated with these assets despite a 40-year service life being applied.

8.9.20. The above service lives take into account product, transport and decommissioning emissions associated with the replacement and maintenance of the assets.

8.9.21. The following assumptions have also been applied to estimate emissions from operational worker transport (distances based on experience of previously consented projects):

- 24 daily on-site workers, with a one-way commuting distance of 25 km, travelling via petrol ca34r; and

- One annual visit for general maintenance requirements, with a one-way commuting distance of 25 km, travelling via diesel van.

8.9.22. Emissions associated with water consumption and treatment for Solar PV module cleaning have also been estimated. Based on publicly available information[38], it has been assumed that 76 litres of water would be required per MWh of anticipated annual generation. The initial year's expected generation (assumed to be 335,000 MWh and may be subject to change for the ES) has been applied and the water use projected onto subsequent years.

8.9.23. Finally, emissions associated with repair are assumed to equal 25% of emissions associated with maintenance, as per RICS (2023)[39] guidance.

Decommissioning phase

8.9.24. It has been assumed that the majority of all materials would be recycled at end of life, with a very small proportion sent to landfill. This has largely been based on publicly available data, namely from disposal scenarios available in Environmental Product Declarations used. All emission factors and Environmental Product Declarations used can be found in **Appendix 8.1** in **Volume 3**.

8.9.25. For decommissioning fuel use (fuel required by plant to deconstruct Rosefield Solar Farm), it has been estimated that the fuel required would be 50% of the fuel used during the construction stage, as per RICS (2023)[40] guidance.

8.9.26. An off-site disposal distance of 100 km has been applied to estimate emissions from transportation of waste materials from the Site to waste processing facilities at end of life. This is a conservative distance based on access to specialist construction recycling facilities.

Assessment criteria and assessment of significance

8.9.27. Impact assessments normally assess to what degree a development would affect the baseline environment of the Study area. In the case of GHG emissions, any emissions would have a long-term, irreversible

[38] SEIA. Available online: [redacted]
[39] Royal Institution of Chartered Surveyors (2023). Whole Life Carbon Assessment for the Built Environment. Available online: [redacted]
[40] Royal Institution of Chartered Surveyors (2023). Whole Life Carbon Assessment for the Built Environment. Available online: [redacted]

negative effect on the global climate, which is considered to be highly receptive to any emissions of GHGs. A specific source of GHG emissions cannot be linked to impacts at a specific location, but would have impacts globally.

8.9.28. This preliminary GHG assessment therefore evaluates the significance of emissions based upon guidance from IEMA's (2022) 'Assessing Greenhouse Gas Emissions and Evaluating their Significance'[41], which provides a framework of determining significance against the goals of the 2015 Paris Agreement[42] (i.e., against a science-based 1.5°C trajectory) (see **Table 8.8**).

8.9.29. The IEMA guidance acknowledges that some projects may replace existing development or baseline activity with a higher GHG profile and thus the significance of a project's emissions should be based on its net impact over its lifetime, which may be positive, negative or negligible. It states that significance should not be determined purely on the magnitude of GHG emissions, but whether a project contributes to reducing GHG emissions consistent with a trajectory towards net zero by 2050.

8.9.30. If GHG emissions cannot be avoided, a goal of the IEMA (2022) process is to identify mitigation options to reduce the project's residual emissions at all stages. If GHG emissions remain significant but cannot be further reduced, approaches to compensate the project's remaining emissions should be considered.

Table 8.8 – Framework for assessment of significant GHG effects

Significance	Level	Criteria
Significant	Major adverse	Project adopts a business-as-usual approach, not compatible with the national net zero trajectory, or aligned with the goals of the 2015 Paris Agreement (i.e., a science-based 1.5°C trajectory). GHG impacts are not mitigated or reduced in line with local or national policy for projects of this type.
	Moderate adverse	Project's GHG impacts are partially mitigated, and may partially meet up-to-date policy; however, emissions are still not compatible with the national net zero

[41] Institute of Environmental Management and Assessment (2022). Assessing Greenhouse Gas Emissions and Evaluating their Significance. Available online: [redacted]

[42] Paris Agreement 2015. Available online: [redacted]

Significance	Level	Criteria
		trajectory, or aligned with the goals of the 2015 Paris Agreement.
Not significant	Minor adverse	Project may have residual emissions, but the project is compatible with the goals of the 2015 Paris Agreement, complying with up-to-date policy and good practice.
	Negligible	Project has minimal residual emissions and goes substantially beyond the goals of the 2015 Paris Agreement, complying with up-to-date policy and best practice.
Significant	Beneficial	Project causes GHG emissions to be avoided or removed from the atmosphere, substantially exceeding the goals of the 2015 Paris Agreement with a positive climate impact.

Climate resilience

8.9.31. This preliminary assessment adopts a standard risk assessment-based methodology to identify potentially significant climate change impacts to Rosefield Solar Farm. Significance has been determined based upon the guidance set out in IEMA's (2020) 'Guide to Climate Change Resilience and Adaptation'[43].

8.9.32. Based on feedback from the Planning Inspectorate received in the Rosefield Solar Farm Scoping Opinion (December 2023), the receptors that are assessed in this preliminary assessment are:

- BESS;
- Inverters;
- Transformers; and
- Rosefield Substation.

8.9.33. The climate change risk assessment considers the likelihood of the climate hazard occurring and the magnitude of the effect.

[43] Institute of Environmental Management and Assessment (2020). Climate Change Resilience and Adaptation. Available online: [redacted]

8.9.34. The likelihood of the hazard is premised upon both the probability and frequency of the projected occurrence. The criteria for likelihood are set out in **Table 8.9**.

Table 8.9 – Definition of likelihood

Likelihood	Description
Very likely	The event occurs multiple times during the lifetime of the Rosefield Solar Farm (40 years) e.g., approximately annually.
Likely	The event occurs several times during the lifetime of the Rosefield Solar Farm (40 years), e.g., approximately once every five years.
Possible	The event occurs limited times during the lifetime of the Rosefield Solar Farm (40 years), e.g., approximately once every 15 years.
Unlikely	The event occurs infrequently during the lifetime of the Rosefield Solar Farm (40 years), e.g., once every 30 years.
Very unlikely	The event may occur once during the lifetime of the Rosefield Solar Farm (40 years).

8.9.35. Magnitude is the degree of change from the relevant baseline conditions caused by climate change. The magnitude of impact takes account of the timing, scale, size, and duration of the potential impact. The criteria for impact magnitude are set out in **Table 8.10**.

Table 8.10 – Definition of impact magnitude

Impact magnitude	Summary
Very large	Substantial change, affecting the majority of the Site and for a prolonged period of time (more than one month) including irreversible changes.
Large	Noticeable change, affecting much of the Site and for a relatively long period of time (more than one week but less than one month).
Moderate	Noticeable change, affecting a few areas of the Site and for a moderate amount of time (more than three days but less than one week).
Minor	Noticeable change, affecting very few of the areas of the Site and for a small amount of time (no more than three days).

Impact magnitude	Summary
Negligible	Negligible and/or unnoticeable change or no change lasting one day or less.

8.9.36. The assessment of likely significant effects employs professional judgement to cross-examine the impact magnitude and likelihood scores using the criteria for significance of effects, as shown in **Table 8.11**. These effects can be either beneficial or adverse.

Table 8.11 – Significance assessment matrix for climate

Likelihood	Impact magnitude				
	Negligible	Minor	Moderate	Large	Very Large
Very unlikely	Negligible	Negligible or minor	Negligible or minor	Minor	Minor or moderate
Unlikely	Negligible or minor	Negligible or minor	Minor	Minor or moderate	Moderate or major
Possible	Negligible or minor	Minor	Moderate	Moderate or major	Major
Likely	Minor	Minor or moderate	Moderate or major	Major	Major
Very likely	Minor or moderate	Moderate or major	Major	Major	Major

8.9.37. Only ‘major’ effects are deemed ‘significant’ and would require additional mitigation to be applied. Where the significance matrix indicates a range for the effect significance (e.g. ‘moderate or major’), professional judgement can be applied to select one option (which would be justified by evidence, as appropriate) or an effect significance range can be applied. If a significance of effect is assigned as ‘moderate or major’, this would be considered significant unless further information could be provided to downgrade the significance effect to ‘moderate’.

8.10. Assessment of likely effects (without additional mitigation)

GHG emissions

8.10.1. GHG emissions associated with Rosefield Solar Farm have been reported using the modular structure as outlined in RICS's (2023) guidance[44]. For the purposes of clarity when interpreting results, the reporting modules are defined as follows:

- A1-3 Product Stage – this category includes the embodied emissions of materials used to construct Rosefield Solar Farm. It includes the emissions associated with raw material extraction, transport to the manufacturing site and manufacturing emissions;
- A4 Transport – this comprises the emissions associated with the transport of materials from the manufacturing site to the construction site;
- A5 Construction and Installation – this source includes 4 sub-categories which include emissions from pre-construction demolition (if applicable), construction activities (such as equipment fuel use), material wastage and construction worker transport;
- B1 In-use emissions – emissions associated with refrigerant gas leaks (if applicable) and emission release from products or reabsorption into products (such as sequestration from timber);
- B2-5 Maintenance, Repair, Replacement and Refurbishment – this includes emissions associated with routine maintenance (B2), repair (B3), replacement of materials (B4) and any planned refurbishment (B5);
- B6 Operational Energy – energy used during the operation of the asset;
- B7 Operational Water – water used during the operation of the asset;
- B8 User activities not covered in B1-7 – emissions may include transport of persons to and from the asset during operation, for example; and
- C1-4 End of Life – this category includes deconstruction and demolition emissions (C1), transport of waste materials from the Site to disposal sites (C2), waste processing for recycling (C3) and disposal emissions from landfill (C4).

[44] Royal Institution of Chartered Surveyors (2023). Whole Life Carbon Assessment for the Built Environment. Available online: [redacted]

Construction phase GHG emissions sources

8.10.2. The preliminary GHG assessment of construction emissions has calculated the life cycle emissions for the building materials and systems, accounting for their embodied emissions, construction, maintenance, repair and replacement emissions.

8.10.3. **Table 8.12** provides an indication of the key emissions sources that are anticipated during the construction phase of Rosefield Solar Farm. The construction GHG emissions are 816,763 tCO_2e, with 92% comprising those from the product stages (modules A1 –A3) and 8% from construction processes (modules A4 – A5).

Table 8.12 – Anticipated key emissions sources during the before-use stage

Description	Emissions (tCO_2e)	Proportion of total emissions
Product Stage (A1 – A3)	748,626	92%
Transport (A4)	17,375	2%
Construction and Installation (A5)	50,762	6%
Total	816,763	100%

8.10.4. The largest emission sources from the A1 – A3 product stage is from the BESS (47%) and the Solar PV modules (43%). A breakdown of the embodied emissions sources for the different components is provided below in **Table 8.13**.

Table 8.13 – Embodied emissions from the manufacture of materials and components

Component	A1-3 embodied emissions (tCO_2e)	Proportion of total A1-3 embodied emissions
BESS	350,000	47%
BESS containers	10,946	1%
Solar PV modules	323,115	43%
Inverters	2,965	<1%
PV framework	10,512	1%
PV foundations	34,575	5%
Rosefield Substation	324	<1%
Transformers	15,268	2%
Inverter Transformer Stations	845	<1%
Switchgear	77	1%

Component	A1-3 embodied emissions (tCO_2e)	Proportion of total A1-3 embodied emissions
Total	748,626	100%

Operational (including maintenance) phase GHG emissions sources

8.10.5. Total operational (including maintenance) GHG emissions equal 562,197 tCO_2e, the majority of which (62%) come from the replacement of the BESS over the lifetime of Rosefield Solar Farm (see **Table 8.14**).

8.10.6. It should be noted that B1 (in use emissions), B5 (planned refurbishment) and B6 (operational energy) emissions are not included in the assessment given that these sources are deemed immaterial or not relevant to the assessment.

Table 8.14 – Use stage emissions from maintenance, repair and replacement of the components and worker transportation

Component	B2-4 maintenance, repair and replacement and B7-8 water and user activities emissions (tCO_2e)	Proportion of total B2-4 maintenance, repair and replacement and B7-8 water and user activities emissions
Battery storage (BESS)	520,191	93%
BESS containers	12,869	2%
Solar PV modules	0	0%
Inverters	9,496	2%
PV framework	0	0%
PV foundations	0	0%
Rosefield Substation and security cabins	3	<1%
Transformers	16,302	3%
Inverter Transformer Stations	0	0%
Switchgear	88	<1%
PV cleaning	383	<1%
Worker transport	2,864	1%
Total	562,197	100%

8.10.7. The carbon sequestration potential of the land is likely to increase based on the proposed planting as part of Rosefield Solar Farm. In the absence of detailed landscaping plans, the carbon sequestration potential has not been quantified for this preliminary assessment. However, it is anticipated that the carbon sequestration potential will increase given that 20% of the Site is set aside for new planting. Further detail on the preliminary landscape and ecological enhancements are detailed in **Volume 2, Figure 3.4.** It is anticipated that this emission source will be included in the climate assessment presented in the ES.

Decommissioning phase GHG emissions sources

8.10.8. GHG emissions from the decommissioning phase of Rosefield Solar Farm have been identified, aligned with standard practice for Life Cycle Assessments (**Table 8.15**). This phase includes emissions from decommissioning fuel use, transport of materials to disposal sites and emissions associated with recycling and landfill. These emissions are subject to a high level of uncertainty, as the decommissioning conditions cannot be predicted with any confidence 40 years into the future.

Table 8.15 – Anticipated key emissions sources during the end of life stage

Description	Total emissions (tCO_2e)	Proportion of total emissions
End of Life (C1 – C4)	171,718	100%

Summary lifecycle GHG emissions

8.10.9. The predicted lifecycle GHG emissions of Rosefield Solar Farm are displayed in **Table 8.16**. Product emissions are the largest emissions source (48%), followed by operational emissions (36%).

Table 8.16 – Lifecycle emissions from Rosefield Solar Farm during construction, operation (including maintenance) and end of life

Description	Total emissions (tCO_2e)	Proportion of total emissions
Product Stage (A1 – A3)	748,626	48%
Construction Progress Stage (A4 – A5)	68,137	4%
Operation (including maintenance) (B2-4 and B7-8)	562,197	36%
End of Life (C1 – C4)	171,718	11%
Total GHG emissions (not including any GHG savings from operation)	1,550,678	100%

GHG savings

8.10.10. GHG savings as part of the operation (including maintenance) of Rosefield Solar Farm and the displacement of fossil-fuel derived electricity within the national electricity network are expected to be considerable and have been quantified below.

8.10.11. Rosefield Solar Farm is assumed to have an installed capacity of 340 MW, and generation of 335,000 MWh in the first year of operation, however, noting that this figure may be subject to change for the ES. Taking into account an annual degradation factor of 0.4%, the total energy generation from the proposed 40-year operational life is approximately 12,405,853 MWh.

8.10.12. Dividing the lifetime emissions of Rosefield Solar Farm (1,550,678tCO_2e) by the lifetime energy generation (12,405,853 MWh) gives a total lifecycle carbon intensity value of 125.0 gCO_2e/kWh.

8.10.13. This cannot be directly compared with the UK grid carbon intensity, or projected future intensities, as published by the Department for Energy Security and Net Zero and the Department for Business, Energy and Industrial Strategy (2024)[45], as those intensities comprise operational emissions only and predominantly come from the combustion of fossil fuels used in the generation of that electricity.

8.10.14. Rosefield Solar Farm will provide electricity to the National Grid that would otherwise be generated by processes with higher carbon intensities, and the benefit of Rosefield Solar Farm, with regards to climate, is to replace the electricity generation from fossil fuels. To assess the GHG savings of Rosefield Solar Farm, operational emissions from a Combined Cycle Gas Turbine (CCGT) have been used as a comparison, as it is currently the most carbon-efficient fossil-fuelled technology available. The carbon intensity of a CCGT is 354 gCO_2e/kWh, and so Rosefield Solar Farm would emit 229 g fewer CO_2e per kWh than if the same electricity were generated by a gas fired CCGT, representing a reduction of 65%.

8.10.15. Over the proposed 40-year lifetime of Rosefield Solar Farm, this equates to GHG savings of over 2.8 million tonnes CO_2e, when compared to CCGT-generated electricity. It should be noted that, like the UK grid carbon intensities published by the UK Government, this comparison does not account for the embodied carbon in the CCGT and is therefore a conservative estimate.

[45] Department for Energy Security and Net Zero (2024) Conversion factors. Available online: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2024

Climate change resilience

8.10.16. Based on feedback from the Planning Inspectorate received in the Rosefield Solar Farm Scoping Opinion (December 2023), the receptors considered in this preliminary assessment are:

- Battery Energy Storage System (BESS);
- Inverters;
- Transformers; and
- Rosefield Substation.

Construction phase

8.10.17. Based upon the historic data and future projections presented by the UK Met Office (**Section 8.6**), the following climate hazards have been identified as requiring further assessment for the construction phase (2028 – 2031):

- Increased temperatures (acute);
- River flooding (acute); and
- Wildfire (acute).

Temperature

8.10.18. The performance of a battery system significantly depends on the operating temperature and the performance of the battery management system. The optimum operating temperatures of a BESS are between 20°C and 35°C; however, this can fluctuate depending on the specific type of battery used (Sarjiya *et al.*, 2022)[46].

8.10.19. Temperatures greater than 35°C have been shown to reduce capacity during the first 50 cycles, and temperatures over 55°C impact the maximum capacity of the BESS (Sarjiya *et al.*, 2022).

8.10.20. The performance of inverters and substations are impacted by environmental factors such as solar irradiance and ambient temperature. However, the degree of impact is hugely dependent on the temperature extremes.

[46] Apribowo, C.H.B., Sarjiya, S., Hadi, S.P. and Wijaya, F.D. (2022). Optimal planning of battery energy storage systems by considering battery degradation due to ambient temperature: a review, challenges, and new perspective. *Batteries*, *8*(12), p.290.

8.10.21. Given the current climatic conditions (described in **Section 8.6**), the likelihood of temperatures above 35 °C in the short-term (2028 – 2031) is deemed 'Unlikely'.

Flood

8.10.22. Based upon the UK Government's tool for long-term flood risk, the Site is predominately located within Flood Zone 1, with a small section on the eastern boundary of fields within Parcel 3, adjacent to the Claydon Brook, that form part of Flood Zones 2 and 3.

8.10.23. The likelihood of river flood has therefore been assessed as 'Unlikely', following the definitions listed in **Table 8.9**. The UK Government tool does not highlight any likelihood of coastal flood, which has been deemed here as 'Very Unlikely'.

Wildfire

8.10.24. In the UK, wildfires are typically limited by fuel moisture and availability, i.e., the amount of dry vegetation or soil (peat) susceptible to burn, and therefore driven by droughts and lack of rainfall rather than temperature. Given the current climatic conditions (described in **Section 8.6**), the likelihood of wildfire in the short-term (2028 – 2031) is deemed 'Unlikely'.

Operational (including maintenance) phase

8.10.25. Based upon the historic data and future projections presented by the UK Met Office in **Section 8.6**, the following climate hazards have been identified as requiring further assessment for the operational (including maintenance) phase (2031 – 2071) of Rosefield Solar Farm:

- Increased temperatures (acute);
- River flooding (acute); and
- Wildfire (acute).

Temperature

8.10.26. The impacts of increased temperatures on the sensitive receptors are listed in **paragraphs 8.10.17** to **8.10.20** Due to the impacts of climate change, (described in **Section 8.6**) the likelihood of temperatures above 35°C in the medium to long-term (2031 – 2071) is deemed 'Possible'.

Flooding

8.10.27. Due to increased likelihood of extreme precipitation events as a result of climate change, river floods are likely to affect the Site on a more regular basis during the operational (including maintenance) phase (2031 – 2071). Therefore, the likelihood has been deemed as 'Possible'. Coastal floods

are still deemed to be 'Very Unlikely' during the operational (including maintenance) phase.

Wildfire

8.10.28. Due to the increased likelihood of drought, decreased summer precipitation and increased temperatures as a result of climate change, wildfires are likely to become more possible on the Site. As such, the likelihood of wildfire has been deemed as 'Possible' for the operational (including maintenance) phase, however these wildfires are likely to be small and localised in nature.

Decommissioning phase

8.10.29. Due to the inherent uncertainty surrounding climate conditions in the far future (40 years), it is impractical to accurately attempt to assess the climate hazards and their impacts during the decommissioning process.

8.11. Additional mitigation

GHG emissions

Construction phase

8.11.1. A large majority of GHG emissions associated with Rosefield Solar Farm would comprise embodied emissions from infrastructure, primarily the BESS and Solar PV modules. The most effective mitigation would therefore be in the responsible sourcing of materials and infrastructure.

8.11.2. An Outline Construction Environmental Management Plan will be submitted in support of the DCO application. This, and the Outline Construction Traffic Management Plan (also to be submitted in support of the DCO application, a 'draft' of which is presented in **Appendix 14.1** in **Volume 3**), will include measures to decrease GHG emissions from the construction process phase. These will include:

- Implement measures to decrease fuel use by maximising energy efficiencies, for example to ensure all vehicles switch off engines when stationary and ensure construction vehicles are well maintained and conform to current emissions standards;
- Promoting the use of sustainable fuels in construction vehicles, and where possible making use of electric vehicles to reduce fuel consumption;
- Liaising with construction staff to minimise GHG emissions associated with commute to Site, including provision of staff minibuses, and promoting of lower carbon modes of travel such as car sharing options and use of public transport;

- Use of locally sourced and/or produced materials. The use of recycled aggregates, where appropriate, for foundations, subbases, hard-standings and pavement materials; and
- Actions to meet the waste hierarchy in accordance with the principles of the Government's Resources and Waste Strategy 2018[47], promoting the recycling of materials by segregating construction waste to be re-used and recycled where practical.

Operational (including maintenance) phase

8.11.3. As the likely effects for climate during the operational (including maintenance) phase are expected to be beneficial, there are limited mitigation measures proposed. However, it is anticipated that use of electric vehicles for operational worker and maintenance visits will be encouraged.

Decommissioning phase

8.11.4. An Outline Decommissioning Environmental Management Plan will be submitted in support of the DCO application. Due to the potential advancements in technology and best practice between the present and the time in which decommissioning of Rosefield Solar Farm would take place, agreement would be sought with the relevant planning authority at the time of decommissioning.

Climate change resilience

Construction phase

8.11.5. Supply chain risks should be considered to determine resilience to climate-related events that may disrupt the procurement of time-sensitive materials.

Operational (including maintenance) phase

8.11.6. Climate hazards and measures to mitigate and adapt to these during the operational (including maintenance) phase of Rosefield Solar Farm have been identified below:

- The condition and integrity of assets would be regularly assessed, and maintenance undertaken as early as required, giving consideration to materials with enhanced tolerance to fluctuating temperatures and exposure to rainfall; and

[47] Department for Environment, Food and Rural Affairs 2018. Resources and waste strategy for England. Available from: Resources and waste strategy for England - GOV.UK (www.gov.uk)

- An Outline Operational Environmental Management Plan will be submitted in support of the DCO application. This will include measures to decrease GHG emissions from the operational (including maintenance) phase.

Decommissioning phase

8.11.7. The decommissioning phase of Rosefield Solar Farm is expected to take place after 40 years of operation. Therefore, consideration must be given to advancements that may be made in this time, which could supersede any measures recommended here.

8.11.8. An Outline Decommissioning Environmental Management Plan will be submitted in support of the DCO application. The Outline Decommissioning Environmental Management Plan will include measures to mitigate and adapt to climate change risks during the decommissioning phase of Rosefield Solar Farm, such as:

- Weather forecasts would be monitored on a daily basis. Forecasts should be used to inform the sequencing of activities and the use of appropriate PPE;
- Welfare facilities including breaks, shade, and hydration facilities, as well as first aid amenities would be provided; and
- Provision of an Incident Response Plan, which identifies flooding as a key site risk and identifies the correct policies and procedures to follow.

8.11.9. The decommissioning phase of Rosefield Solar Farm would present similar risks to those experienced during the construction phase, and any measures recommended would be assessed for their applicability in this phase.

8.12. Assessment of residual effects (with additional mitigation)

GHG emissions

8.12.1. Renewable energy developments such as Rosefield Solar Farm have a major role to play in the transition to a low carbon economy, and the decarbonisation of the UK national electricity network. Without projects such as Rosefield Solar Farm, the GHG intensity of the UK's electricity generation would not decrease as projected and would severely compromise the UK's ability to meet its carbon reduction targets.

8.12.2. Emissions from the construction, operation (including maintenance) and decommissioning of Rosefield Solar Farm total 1.6 million tCO_2e (**Table 8.16**), whilst operational savings are over 3.8 million tCO_2e. The net GHG savings, compared against equivalent gas-fired electricity generation, are therefore 2.2 million tonnes of CO_2e.

8.12.3. Rosefield Solar Farm is therefore considered likely to have a **positive significant** effect on the climate over its life-cycle.

Climate resilience

8.12.4. The vast majority of climate hazards were found to pose a **negligible or minor adverse** significance of effect to the receptors identified, prior to any additional mitigation, during the construction and operational (including maintenance) phases. The only climate hazard that poses a **moderate adverse** significance of effect occurs during the operational (including maintenance) phase, and relates to river flooding (due to the small area of the Site which falls into Flood Zone 3).

Construction phase

8.12.5. **Table 8.17** presents the likely significance of the identified climate hazards on the four highlighted receptors for the construction phase of Rosefield Solar Farm.

8.12.6. No hazards were identified as likely to have a significant effect on Rosefield Solar Farm during the construction phase.

Table 8.17 – Summary of likely climate change effects on the construction of Rosefield Solar Farm

Receptor	Hazard	Likelihood	Impact Magnitude	Significance of effect
BESS	Increased temperatures (>35°C)	Unlikely	Minor	Negligible adverse
	River Flooding	Unlikely	Moderate	Minor adverse
	Coastal Flooding	Very Unlikely	Moderate	Negligible adverse
	Wildfire	Unlikely	Moderate	Minor adverse
Inverters	Increased temperatures (>35°C)	Unlikely	Minor	Negligible adverse
	River Flooding	Unlikely	Moderate	Minor adverse
	Coastal Flooding	Very Unlikely	Moderate	Negligible adverse
	Wildfire	Unlikely	Moderate	Minor adverse
Transformers	Increased temperatures (>35°C)	Unlikely	Minor	Negligible adverse
	River Flooding	Unlikely	Moderate	Minor adverse

Receptor	Hazard	Likelihood	Impact Magnitude	Significance of effect
	Coastal Flooding	Very Unlikely	Moderate	Negligible adverse
	Wildfire	Unlikely	Moderate	Minor adverse
Substations	Increased temperatures (>35°C)	Unlikely	Minor	Negligible adverse
	River Flooding	Unlikely	Moderate	Minor adverse
	Coastal Flooding	Very Unlikely	Moderate	Negligible adverse
	Wildfire	Unlikely	Moderate	Minor adverse

Operational (including maintenance) phase

8.12.7. **Table 8.18** displays the likely significance of the identified climate hazards on the four highlighted receptors for the operational (including maintenance) phase of Rosefield Solar Farm.

8.12.8. No hazards were identified as likely to have a significant effect on Rosefield Solar Farm during the operational (including maintenance) phase.

8.12.9. River flooding, while classed as having an effect of **moderate** significance, only relates to a small area of the Site which falls within Flood Zone 3. None of the receptors assessed are also located within this area, and therefore the effect is deemed **not significant**.

Table 8.18 – Summary of likely climate change effects on the operation (including maintenance) of Rosefield Solar Farm

Receptor	Hazard	Likelihood	Impact Magnitude	Significance of effect
BESS	Increased temperatures (>35°C)	Possible	Minor	Minor adverse
	River Flooding	Possible	Moderate	Moderate adverse
	Coastal Flooding	Very Unlikely	Moderate	Minor adverse
	Wildfire	Possible	Minor	Minor adverse
Inverters	Increased temperatures (>35°C)	Possible	Minor	Minor adverse

Receptor	Hazard	Likelihood	Impact Magnitude	Significance of effect
	River Flooding	Possible	Moderate	Moderate adverse
	Coastal Flooding	Very Unlikely	Moderate	Minor adverse
	Wildfire	Possible	Minor	Minor adverse
Transformers	Increased temperatures (>35°C)	Possible	Minor	Minor adverse
	River Flooding	Possible	Moderate	Moderate adverse
	Coastal Flooding	Very Unlikely	Moderate	Minor averse
	Wildfire	Possible	Minor	Minor adverse
Substations	Increased temperatures (>35°C)	Possible	Minor	Minor adverse
	River Flooding	Possible	Moderate	Moderate adverse
	Coastal Flooding	Very Unlikely	Moderate	Minor adverse
	Wildfire	Possible	Minor	Minor adverse

Decommissioning phase

8.12.10. Due to the inherent uncertainty surrounding climate conditions in the far future (40 years), it is impractical to accurately attempt to assess the climate hazards and their impacts during the decommissioning process, though they are anticipated to be equivalent to those identified during the operational (including maintenance) phase.

8.13. Opportunities for enhancement

8.13.1. The nature of Rosefield Solar Farm offers an enhancement to the baseline environment in terms of GHG emissions.

8.14. Difficulties and uncertainties

8.14.1. The information provided in this PEIR is preliminary and is based on the information available at the time of writing. A full assessment of likely significant effects will be reported in the ES.

8.14.2. The accuracy of a GHG assessment depends on the quality of the data provided. The fact that this preliminary assessment represents a forecast

from a future scenario means that all data is 'secondary' (extrapolated, estimated or benchmarked). Assessments such as this, based largely on secondary data, should be viewed as an estimate of GHG emissions impact, and actual emissions may vary.

8.14.3. To mitigate against this, a conservative approach has been adopted, whereby the most reasonable worst-case scenario has been assumed. For example, the infrastructure manufacturer for Rosefield Solar Farm has not yet been selected, and it has been assumed that the majority of the products will be sourced from East Asia, as this is a conservative estimation of both the embodied and transport emissions compared to modules being sourced from Europe.

8.14.4. As with all climate models, there are inherent limitations to the models used. In particular, the estimated ranges for future climate variability are conditional on a number of assumptions with expert judgement playing a role in the various methodological and data choices. The UKCP18 projections used here are considered the optimal projection models to use within the UK.

8.15. Further work required to inform the ES

8.15.1. This preliminary assessment has considered the main expected material sources of GHG emissions for Rosefield Solar Farm and likely effects associated with climate resilience. The full ES will be based upon more detailed project data once the design has been finalised.

9. Cultural Heritage

9.1. Introduction

9.1.1. This chapter presents a preliminary assessment of the likely significant effects arising from the construction, operation (including maintenance) and decommissioning of Rosefield Solar Farm upon cultural heritage and should be read in conjunction with the following appendices in **Volume 3**:

- **Appendix 9.1 – Archaeological Desk-based Assessment**;
- **Appendix 9.2 – Interim Geophysical Survey Interpretation;** and
- **Appendix 9.3 – Stage 1 Setting Assessment**.

9.2. Stakeholder engagement

9.2.1. **Table 9.1** provides a summary of the engagement undertaken to date to inform this preliminary assessment.

Table 9.1 – Engagement undertaken to date

Stakeholder	Date and method	Key matters discussed
Buckinghamshire Council Historic Environment Record Officer	9 May 2023 - Email	1 km Study area agreed for non-designated assets.
National Trust	30 January 2024 – Teams meeting	Discussion of settings impacts for Claydon House and the Registered Park and Garden. 5 km Study area agreed for designated assets.
Historic England	5 May 2024 – Teams meeting	Discussion of settings impacts of designated assets in the Study area.
National Trust and Historic England	23 March 2024 – Site meeting	Consultation undertaken on Site. Discussion of settings impacts for Knowl Hill, Ridgeline in Parcel 2 and Claydon House.
Buckinghamshire Council Archaeological Advisor	6 March 2024 - Teams call and Email	Discussion of need for geophysics and scope of trenching.

Stakeholder	Date and method	Key matters discussed
Buckinghamshire Council Archaeological Advisor	26 June 2024 – Teams call and Email	The emerging geophysical survey results were discussed along with areas of ecological mitigation/enhancement that might disturb archaeology. The approach to trial trenching was discussed. Buckinghamshire Council happy with a bespoke approach rather than a specific percentage. The Applicant will consider trenching in areas where ponds/scrapes or large areas of tree planting (i.e. more than hedgerow enhancement) are proposed. Buckinghamshire Council agreed that a phased programme would be appropriate. Buckinghamshire Council agreed that areas that will have no development can be "de-scoped" from the trenching.

9.3. Legislative framework, planning policy and guidance

9.3.1. The preliminary assessment has been undertaken with regard to the following legislation, planning policy and guidance.

Legislation

- Ancient Monuments and Archaeological Areas Act 1979[1];
- Planning (Listed Buildings and Conservation Areas) Act 1990[2];
- Treasure Act 1996 (as amended)[3];
- Burial Act 1857[4];

[1] Ancient Monuments and Archaeological Areas Act 1979. Available online: https://www.legislation.gov.uk/ukpga/1979/46
[2] Planning (Listed Buildings and Conservation Areas Act 1990). Available online: https://www.legislation.gov.uk/ukpga/1990/9/contents
[3] Treasure Act 1996 (as amended). Available online: https://www.legislation.gov.uk/ukpga/1996/24/contents
[4] Burial Act 1857. Available online: https://www.legislation.gov.uk/ukpga/Vict/20-21/81/contents

- Protection of Military Remains Act 1986[5];
- The Hedgerows Regulations 1997[6];
- Historic Buildings and Ancient Monuments Act 1953[7]; and
- National Heritage Act 1980 (as amended)[8].

National planning policy

- Overarching National Policy Statement for Energy (NPS EN-1) (2023)[9]: Section 5.9. This section of the document outlines the key considerations and general method for assessment of any likely significant impacts on the historic environment.
- National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (2023)[10]: Paragraphs 2.3.6, 2.3.8 and 2.10.107 - 119. These paragraphs discuss the requirement for applicants to consider impacts to nationally recognised designations (such as World Heritage Sites and Registered Parks and Gardens) and the historic environment as a whole during the selection and design of a solar PV site, in addition to specific guidance on how these impacts can be identified, assessed and mitigated against.
- National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (2023)[11]: Paragraphs 2.2.10, 2.9.19 and 2.9.25. These paragraphs confirm the applicant's responsibility to abide by Schedule 9 of the Electricity Act 1989 (which highlights the desirability of preserving

[5] Protection of Military Remains Act 1986. Available online: https://www.legislation.gov.uk/ukpga/1986/35/contents
[6] The Hedgerows Regulations 1997. Available online: https://www.legislation.gov.uk/uksi/1997/1160/contents/made
[7] Historic Buildings and Ancient Monuments Act 1953. Available online: https://www.legislation.gov.uk/ukpga/Eliz2/1-2/49/contents
[8] National Heritage Act 1980 (as amended). Available online: https://www.legislation.gov.uk/ukpga/1980/17/contents
[9] Department for Energy Security and Net Zero (2023). Overarching National Policy Statement for Energy (EN-1). Available online: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1
[10] Department for Energy Security and Net Zero (2023). National Policy Statement for Renewable Energy Infrastructure (EN-3). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3
[11] Department for Energy Security and Net Zero (2023). National Policy Statement for Electricity Networks Infrastructure (EN-5). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5

features of archaeological or historic interest), and discuss the requirement for applicants, when siting substations, to seek to avoid their siting within internationally and nationally designated areas of the highest amenity, cultural or scientific value (such as World Heritage Sites, Scheduled Monuments, Registered Battlefields and Listed Buildings) and to protect (as far as reasonably practicable) important landscape features such as historic hedgerows. They also outline the requirement for the Secretary of State to grant the installation of underground cabling over overhead transmission lines if the benefits of doing so clearly outweigh the harm to designated and non-designated heritage assets and their settings.

- National Planning Policy Framework (NPPF) (2023)[12]: Section 16 'Conserving and enhancing the historic environment'. This section confirms that the historic environment, including archaeological remains, constitutes a material consideration in planning decisions, requiring applicants to describe the significance of heritage assets potentially affected by a development, including any contribution made by their setting, as well as assess impacts on them by a development. NPPF empowers planning authorities to request evaluation fieldwork to inform determination of applications.

Local planning policy

- Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021) – specifically Policy BE1[13]: This policy includes the desirability for proposed developments to use heritage assets to reinforce local distinctiveness, create a sense of place, and assist in the delivery of the economic well-being of the area, and for the significance, views, setting, character, appearance and context of heritage assets, both designated and non-designated, to be conserved. It also confirms the Council's stance that *"Proposals which affect the significance of a non-designated heritage asset should be properly considered, weighing the direct and indirect impacts upon the asset and its setting. There will be a presumption in favour of retaining heritage assets wherever practical, including archaeological remains in situ, unless it can be demonstrated that the harm will be outweighed by the benefits of the development. Heritage statements and/or archaeological evaluations may be required*

[12] Ministry of Housing, Communities and Local Government and Department for Levelling Up, Housing and Communities (2023). National Planning Policy Framework. Available online: https://www.gov.uk/government/publications/national-planning-policy-framework--2

[13] Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021). Available online: [redacted]

to assess the significance of any heritage assets and the impact on these by the development proposal."

Guidance

- Chartered Institute for Archaeologists' Code of Conduct: professional ethics in archaeology[14];
- Chartered Institute for Archaeologists' Standard and guidance for historic environment desk-based assessment[15];
- The Setting of Heritage Assets (Historic England Good Practice Advice in Planning GPA3)[16];
- Statements of Heritage Significance: Analysing Significance in Heritage Assets (Historic England Advice Note 12)[17];
- Managing Significance in Decision-Taking in the Historic Environment (Historic England Good Practice Advice in Planning GPA2)[18]; and
- IEMA, Institute of Historic Building Conservation and Chartered Institute for Archaeologists (2021), Principles of Cultural Heritage Impact Assessment in the UK[19].

9.4. Study area

9.4.1. Following consultation with Buckinghamshire Council (refer to **Table 9.1**), a 1 km Study area surrounding the Site boundary has been used for consideration of non-designated heritage assets.

[14] CifA. Code of Conduct. Available online: [redacted]

[15] CifA. Standards and Guidance for Historic Environment Desk-Based Assessment. Available online: [redacted]

[16] Historic England GPA3. Available online: [redacted]

[17] Historic England GPA12. Available online: [redacted]

[18] Historic England GPA2. Available online: [redacted]

[19] IEMA Principles of Cultural Heritage Impact Assessment in the UK. Available online: [redacted]

9.4.2. Following consultation with the National Trust and Historic England (refer to **Table 9.1**), a Study area of up to 5 km surrounding the Site boundary, informed by the Zone of Theoretical Visibility (ZTV) model, has been used for consideration of potential significant effects on designated heritage assets.

9.5. Establishing baseline conditions

9.5.1. The following data sources have been used to understand the existing cultural heritage conditions:

- Information on designated heritage assets from the National Heritage List for England;
- Data on non-designated heritage assets, previous archaeological investigations and historic landscape characterisation from the Buckinghamshire Historic Environment Record (HER);
- Historic Ordnance Survey mapping;
- Maps and other relevant primary and secondary sources held in Buckinghamshire archives;
- Portable Antiquities Scheme (PAS) data;
- LiDAR data;
- Aerial photographs held by Historic England Archives, Buckinghamshire HER; and
- Cambridge University Collection of Aerial Photography.

9.5.2. The following surveys have been undertaken to inform the existing cultural heritage conditions:

- Archaeological desk-based assessment, supplemented by a field visit on 10 October 2023 (**Appendix 9.1** in **Volume 3**);
- Geophysical survey (ongoing) (**Appendix 9.2** in **Volume 3**); and
- Initial setting visits to heritage assets on 10 October 2023. The Site was revisited on 26 March 2024 with Historic England and National Trust to further discuss the setting of designated heritage assets associated with Claydon House (refer to **Table 9.1**).

9.6. Environmental baseline

9.6.1. Overall, there are 198 recorded non-designated heritage assets within the Site boundary and 937 recorded non-designated heritage assets beyond the Site boundary but within the 1 km Study area. There are no designated heritage assets recorded within the Site boundary; however, 542 designated heritage assets are recorded beyond the Site boundary but

within the 5 km Study area. The setting of these assets has been discussed in **Appendix 9.3** in **Volume 3**.

9.6.2. Of those non-designated heritage assets within the Site boundary, two date to the Iron Age, seven to the Romano-British period, twelve date to the medieval period, 176 date to the post-medieval period and one dates to the modern period.

9.6.3. The baseline desk-based assessment (**Appendix 9.1** in **Volume 3**) has determined the following archaeological potential within the Site; where the potential varies across the Site, this is noted:

- Early Prehistoric – negligible to low (at depth throughout the Site);
- Iron Age – high (Parcel 3);
- Roman – medium (Parcel 3);
- Early Medieval to Medieval – low to medium (Parcels 2 and 3);
- Post-Medieval – high (Parcel 1a); and
- Modern – low (Parcels 1, 2 and 3).

9.6.4. It has been determined that there is high potential for previously unknown remains of an Iron Age date to survive within Parcel 3. This potential is considered to be low across the rest of the Site.

9.6.5. Currently unknown heritage assets within the Site boundary are most likely to take the form of prehistoric or Romano-British cut features and findspots; historic small-scale industrial, occupation or agricultural remains; or paleoenvironmental remains of prehistoric or historic date.

9.6.6. Within the Site boundary are 12 hedgerows which form the boundaries of non-designated heritage assets, and 29 field boundaries. These field boundaries and hedgerows are protected in accordance with Criteria 1, 2, 3 and 5 of the Hedgerows Regulations 1997[20].

9.6.7. The Grade II Registered Park and Garden of Claydon (National Heritage List for England (NHLE) reference 1000597) lies *c*. 70 m from the north-east of the Site boundary at its closest point. Grade II listed building Claydon House (NHLE reference 1288461) sits centrally within the park, *c*. 580 m to the north of the Site boundary. The park was landscaped by James Sanderson between 1763 and 1776 for the Verney family. Claydon derives its significance from its historic and artistic interest as an 18th century landscaped park. The Registered Park and Garden also derives

[20] Hedgerows Regulations 1997. Available online: The Hedgerows Regulations 1997 (legislation.gov.uk)

significance from its wider agricultural surroundings as well as the woodlands to the south.

9.6.8. The significant views out from the Registered Park and Garden of Claydon are to the west from the terrace of the main house and to the south from the southern lawn, which are the main designed views from the house. The agricultural setting of the Registered Park and Garden can also be appreciated to the north, east and west of the registered area in other views.

9.6.9. There is an additional view looking south-east along an access route into the Registered Park and Garden of Claydon lined by trees on either side. This tree line previously extended into the Site boundary during the post-medieval period. The heritage significance of this view is still being investigated and a significant effect is possible; this will be addressed further in the ES.

Future baseline

9.6.10. In the absence of Rosefield Solar Farm, the future baseline for cultural heritage and archaeology could change in the following ways:

- New heritage assets may be designated and/or currently designated heritage assets may be removed from statutory lists/registers;
- New heritage assets may be identified;
- Upstanding remains pertaining to built heritage and archaeological heritage assets may be degraded by the impacts of weather and the growth or proliferation of vegetation; and
- Below-ground archaeological remains may be disturbed or truncated by agricultural activities such as ploughing or the establishment of new tree plantations, or may be negatively impacted by changes in soil moisture levels, particularly if flooding occurs within the Study area.

9.6.11. Changes to the designated status of assets within the Study areas will be monitored and the baseline data from the Buckinghamshire HER will be refreshed during the EIA process to ensure that the ES is based on up-to-date information.

9.6.12. Changes to the integrity of heritage assets as a result of weather, vegetation growth, and agricultural practices would be relatively slow to become apparent and unlikely to alter the heritage significance of heritage assets between submission of the DCO application and construction commencing.

9.7. Mitigation embedded into the design

9.7.1. This preliminary assessment has been based on the principle that measures have been ‘embedded’ into the design of Rosefield Solar Farm

to remove potential likely significant effects as far as practicable, for example by the considered placement of infrastructure. Embedded (primary) environmental mitigation measures that are considered to be an inherent part of Rosefield Solar Farm are detailed within **Chapter 5: Approach to the EIA**. The embedded mitigation measures relevant to cultural heritage and the benefits these provide are outlined in **Table 9.2** below.

Table 9.2 – Embedded mitigation measures relevant to cultural heritage

Embedded mitigation measures relevant to cultural heritage	Benefit
No Solar PV development will occur within the centre/north of the Site (between Parcels 1, 1a and 2).	Avoid or reduce potential impacts to the settings of designated assets within Middle Claydon and Botolph Claydon Conservation Areas.
Removal of Knowl Hill (Field B17) and half of Field B9 from Solar PV development.	Avoid or reduce potential impacts to the settings of designated asset Claydon House (1288461) and Registered Park and Garden Claydon Park (1000597)
Removal of fields in the southern part of Parcel 2 (Fields D27 and D30 to D37) from Solar PV development.	Avoid or reduce potential impacts to the settings of designated assets Dry Leys Farmhouse (1319271) and Finemerehill House (1117815).
Removal of fields south-west of Botolph Claydon (Fields D1, D2, D3 North and D5) from Solar PV development.	Avoid or reduce potential impacts to the settings of designated assets within Botolph Claydon Conservation Area.
Removal of fields in Parcel 1a (Fields C1, C2 and C3) from Solar PV development.	Avoid or reduce potential impacts to the setting of designated asset Finemerehill House (1117815)
Preservation of historic hedgerows within the Site.	All historic hedgerows will be retained intact, therefore ensuring no loss of such assets.
Landscape screening where appropriate, as shown in **Figure 3.4: Landscape and Ecological Mitigation and Enhancements Plan** in **Volume 2**.	Avoid or reduce potential impacts to the settings of designated assets in the surrounding area.

9.8. Optionality

9.8.1. **Chapter 5: Approach to the EIA** sets out those elements of Rosefield Solar Farm for which optionality is present within the current design and sets out the scenarios assessed for the purpose of this PEIR.

9.8.2. The preliminary design principles as outlined in **Chapter 5: Approach to the EIA** and preliminary parameter plans (**Figures 3.1** to **3.5** in **Volume 2**) set out the reasonable 'worst case scenario' that has been assessed within this chapter. The 'worst case scenario' options in relation to this preliminary cultural heritage assessment are described in **Table 9.3** below.

Table 9.3 – Optionality scenarios assessed

Project element	Scenario assessed for this preliminary assessment
Satellite Collector Compounds	This preliminary assessment has considered the siting of the Satellite Collector Compound in Parcel 1 within either Field B10 or Field B23, as it is considered likely that there will be no significant difference in effects relating to cultural heritage with either scenario, as either location could contain currently unknown remains. For the same reason, all three field options (Fields D8, D9 and D17) are considered for the location of the Satellite Collector Compound in Parcel 2.
Main Collector Compound	The four fields that are being considered for the Main Collector Compound have all been taken into consideration within this preliminary assessment, as it is considered likely that there will be no significant difference in effects relating to cultural heritage with any scenario.
BESS	This preliminary assessment considers both Scenario 1 and Scenario 2 for the location of the BESS, as it is considered likely that there will be no significant difference in effects relating to cultural heritage with either scenario.
Rosefield Substation	This preliminary assessment considers both Scenario 1 and Scenario 2 with respect to the Rosefield Substation location, as it is considered likely that there will be no significant difference in effects relating to cultural heritage with either scenario.
Cable route to connect the Solar PV Modules, BoSS, Collector	For the purposes of this preliminary assessment, both of the cable route options have been considered, as it is considered likely that there will be no significant

Project element	Scenario assessed for this preliminary assessment
Compounds, Rosefield Substation and BESS	difference in effects relating to cultural heritage with either scenario.
BoSS	This preliminary assessment assumes the BoSS to be located independently outdoors and central inverters would be used as this will require groundworks over a larger area than containerised ITS and therefore represents a realistic 'worst case' for impacts on below ground archaeological remains.
Construction Compounds	For the purposes of this preliminary assessment, all suitable locations proposed for the Main and Satellite Construction Compounds have been considered, as it is considered likely that there will be no significant difference in effects relating to cultural heritage.

Preliminary assessment assumptions

9.8.3. For the purposes of this preliminary assessment, it has been assumed that Solar PV modules will be supported on piled foundations and that all cables will be buried in excavated trenches. This represents a worst case for potential archaeological impacts during construction.

9.8.4. The maximum parameter heights have been used to produce the ZTV which the setting assessment has relied upon. The ZTV has also used a "bare earth" model that assumes no vegetation or other screening and therefore represents a worst case for potential visibility of Rosefield Solar Farm.

9.9. Approach to the preliminary assessment

Importance of heritage assets

9.9.1. The importance of a heritage asset is a measure of the degree to which the heritage significance of that asset is sought to be protected through legislation and planning policy. The level of importance will therefore reflect any statutory and non-statutory heritage designation or, in the case of undesignated assets, the professional judgement of the assessor as to the degree of importance that the asset has with reference to regional research frameworks.

9.9.2. The criteria presented in **Table 9.4** has been used to establish the importance of heritage assets. Assessment of importance is based on a combination of designated status and professional judgement. It takes into account the Secretary of State's criteria for the scheduling of ancient monuments and principles of selection criteria for listed buildings. It is also

recognised that, occasionally, sites can have a lower or higher than normal importance within a particular environment. The assessment of importance therefore needs to take into account the part of the Study area that is being affected and the ability of the Study area to absorb change without compromising the understanding or appreciation of the historic environment.

Table 9.4 – Criteria for establishing the importance of heritage assets

Importance	Description of receptors
Very High	World heritage sites; assets of acknowledged international importance; assets that can contribute significantly to acknowledged international research objectives; Historic landscapes of international value (designated or not) and extremely well preserved historic landscapes with exceptional coherence, time depth or other critical factor(s).
High	Scheduled monuments and non-designated assets of schedulable quality and importance; Grade I and II* listed buildings and Grade II listed buildings that can be shown to have exceptional qualities in their fabric or associations; Conservation Areas with exceptional qualities; non-designated structures of clear national importance; designated and non-designated historic landscapes of historic interest; assets that can contribute significantly to acknowledged national research objectives.
Medium	Grade II listed buildings; Non-designated assets that contribute to regional research objectives; Locally listed buildings and other historic unlisted buildings that have exceptional qualities; Conservation Areas.
Low	Non-designated assets of local importance including those compromised by poor preservation; assets of limited value but with the potential to contribute to local research objectives; robust non-designated historic landscapes.
Negligible	Assets with very little surviving archaeological interest; buildings of little architectural or historic note; landscapes with little historic interest.

Magnitude of impact

9.9.3. The impact will reflect the scale of change which would be caused by Rosefield Solar Farm and the effect this would have on ability to interpret significance and appreciate the historic asset. Impacts can result either from physical changes to a historic asset or through sensory changes within its setting.

9.9.4. An impact may be positive where, for example as part of the development, an intrusive building or feature is removed or replaced with a more harmonious one; historic features are restored or revealed; a new feature is added which adds to public appreciation; new views are introduced that add to public experience of an asset; or public interpretation or access is improved to an asset or its setting.

9.9.5. Impacts may impart a major change, for example, where groundworks completely destroy important archaeological remains, to a minor change to part of a historic asset's setting, leading to a limited impact on our ability to interpret it, or its context.

9.9.6. Utilising the key principles for assessing the implications of change outlined above, an assessment of the magnitude of impact has been implemented for each heritage asset using the criteria presented in **Table 9.5** below. In the absence of directly applicable guidance, these criteria have been based on professional judgement.

9.9.7. Conclusions of the assessed magnitude of impacts are a product of the consideration of the elements of an asset and its setting that contribute to its heritage significance and the degree to which Rosefield Solar Farm would change these contributing elements. This preliminary assessment therefore reflects the varying degrees of sensitivity of different assets to change brought about by different types of development.

Table 9.5 – Criteria for classifying magnitude of impact

Impact magnitude	Criteria
Major	Change to key historic building elements so that an asset is totally altered; OR change to most/all key archaeological materials such that the resource is totally altered; OR comprehensive change to the setting such that the significance of the asset is severely compromised.
Moderate	Change to many key historic building elements, such that the asset is significantly modified; changes to many key archaeological materials such that the resource is clearly modified; changes to setting of an asset, such that the significance of the asset is compromised.
Minor	Change to key historic building elements, such that the asset is slightly different; changes to key archaeological materials such that the asset is slightly altered; changes to setting of an historic building, such that its significance is slightly compromised.
Negligible	Very minor changes to historic building elements, archaeological materials or setting that hardly affect them/it.

Impact magnitude	Criteria
No Change	No change to fabric, archaeological materials or setting.

Significance of effect

9.9.8. The preliminary assessment of likely significant effects has combined analysis of the data gathered during the desk-based assessment and site visit, photographs and any annotated photographs (**Volume 4: Landscape Visualisations**) of the topography and Rosefield Solar Farm.

9.9.9. Significance of effect has been determined using a combination of importance of the asset (receptor) and the magnitude of impact upon that asset (receptor). The significance of effect matrix is presented in **Table 9.6** below and provides a guide to decision-making but is not a substitute for professional judgement and interpretation, particularly where the importance or impact magnitude levels are not clear or are borderline between categories. The significance of effect may therefore be described on a continuous scale from 'no effect' to 'very large'. The significance of effect can be either beneficial or adverse. Where the matrix presents two options for significance of effect, professional judgement is used to determine the likely significance with regard to the specific circumstances of the importance of the asset and magnitude of effect (which will be fully described where necessary). These criteria are based on professional judgement.

9.9.10. 'Very large', 'large' and 'moderate' effects are regarded as 'significant' while 'slight' and 'neutral' effects are regarded as 'not significant'. Where the significance matrix indicates a range for the effect significance (e.g. 'slight or moderate'), professional judgement can be applied to select one option (which would be justified by evidence, as appropriate) or an effect significance range can be applied. If a significance of effect is assigned as 'slight or moderate', this would be considered significant unless further information could be provided to downgrade the significance effect to 'slight'.

Table 9.6 – Criteria for assessing the significance of effect

Importance	Impact magnitude				
	No Change	Negligible	Minor	Moderate	Major
Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large

Importance	Impact magnitude				
	No Change	Negligible	Minor	Moderate	Major
High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

9.10. Assessment of likely effects (without additional mitigation)

9.10.1. The layout of Rosefield Solar Farm is still being finalised and investigations to establish the archaeological resource of the Site are ongoing. There remains uncertainty regarding both the direct physical impacts on heritage assets as a result of construction, and the extent of change within the setting of heritage assets within the Study area. This has therefore resulted in assets being considered within this PEIR which may, once the design has been refined, not need to be considered in the subsequent ES as effects will have been avoided.

9.10.2. As stated in **Section 9.9**, only those impacts which result in 'major' or 'moderate' effects are regarded as significant. Therefore, by definition, impacts on heritage assets of negligible importance are not considered likely significant effects. Thus, only designated heritage assets within the Site boundary and 5 km Study area (all of medium or high importance) and non-designated heritage assets within the Site boundary and 1 km Study area of greater than negligible importance could experience significant effects (see **Table 9.6** above). For assets of low importance, significant effects would only occur with an impact of major magnitude.

9.10.3. Likely significant effects on cultural heritage assets may take the form of physical impacts to in situ archaeological remains pertaining to or associated with a heritage asset or changes to attributes of its setting which contribute to its significance.

Possible physical impacts

9.10.4. Physical impacts could include damage to below and/or above-ground archaeological remains pertaining to or associated with a heritage asset, particularly if it lies within the Site boundary. Such impacts could occur

during the construction phase of Rosefield Solar Farm due to construction groundworks or during the operational (including maintenance) phase of Rosefield Solar Farm due to changes in soil conditions (such as moisture levels).

Possible settings impacts

9.10.5. Impacts to a heritage asset's setting could cause changes to an attribute of that setting which contributes to the significance of that heritage asset. The Archaeological Desk-Based Assessment (**Appendix 9.1** in **Volume 3**) and Stage 1 Setting Assessment (**Appendix 9.3** in **Volume 3**) discusses the attributes of each heritage asset's setting which contributes to its significance in greater detail.

9.10.6. Such impacts could take the form of, for example, the temporary loss of a heritage asset's setting attribute of tranquillity during the construction phase of Rosefield Solar Farm arising from noise, light and dust associated with groundworks. Another possible impact during both the construction and operation (including maintenance) phases of Rosefield Solar Farm could be the partial loss of a heritage asset's setting attributes of surrounding undeveloped land or green space between a heritage asset and present-day urban occupation and industrial or economic activity. It is possible that designed and/or key views between the Grade II Claydon Registered Park and Garden (NHLE 1000597) and Claydon House (NHLE 1288461) and associated designated heritage assets could be partially lost during the construction and operation (including maintenance) phases of Rosefield Solar Farm.

Assets for which no likely significant effects are anticipated

9.10.7. Of the 14 designated assets that the screening exercise indicated might experience significant effects (see **Appendix 9.1** in **Volume 3**), six of them are no longer considered likely to be at risk of physical impacts from or vulnerable to changes in their setting by Rosefield Solar Farm due to the evolution of its proposed layout and design. The justification for this is given in **Table 9.7** below and agreement will be sought with Buckinghamshire Council through consultation.

Table 9.7 – Justification for no predicted likely significant effects on designated heritage assets of high and medium importance

Asset	Justification
23, Orchard Way (NHLE 1212262) Weir Cottage (NHLE 1212347)	These assets are of **medium** importance. The assets do not lie within the Site boundary and no in situ archaeological remains associated with them are anticipated to extend into the Site. No physical impacts on the assets are therefore predicted.

Asset	Justification
1 and 3, Orchard Way (NHLE 1212259) Pond Cottage (NHLE 1212261) 5, Orchard Way (NHLE 1289627) Quamby (NHLE 1289628)	Predicted impacts through changes to the setting of these assets are anticipated to be limited to impacts to their setting attributes of tranquillity during cable route groundworks. These will be temporary and the land returned to its undeveloped state following the installation of the cable. The predicted magnitude of impacts to their significance are therefore **minor** ('changes to setting of an historic building, such that its significance is slightly compromised'), **temporary** and **short-term**. The significance of effect is thus **slight adverse** and therefore **not significant**.

Assets for which likely significant effects are anticipated

9.10.8. Based on the current design of Rosefield Solar Farm as presented in this PEIR, significant adverse effects are likely on seven designated heritage assets. These are:

- Claydon House (NHLE 1288461)
- Claydon Registered Park and Garden (NHLE 1000597)
- Finemerehill House (NHLE 1117815)
- Pond Farmhouse (NHLE 1214849)
- Dry Leys Farmhouse (NHLE 1319271)
- Middle Claydon Conservation Area
- Botolph Claydon Conservation Area

9.10.9. One non-designated heritage asset of up to **medium** importance is at risk of likely significant adverse effects within or below the upper range of less than substantial harm. This is:

- Catherine Farm (HER Reference: MBC26340)

9.11. Additional mitigation

Construction phase

9.11.1. Areas of the Site that have so far not had a geophysical survey undertaken, or where certain design aspects have not yet been decided, (such as the cable route options) will be surveyed prior to the preparation of the ES. A programme of archaeological trenching informed by the geophysical survey results will also be carried out prior to the preparation of the ES. The results of these surveys will be included within the ES and

will inform proposals for appropriate mitigation measures (such as preservation in situ or a programme of archaeological investigation and recording secured by a DCO requirement).

9.11.2. Where archaeological remains within the Site do not require preservation in situ and cannot be avoided through embedded mitigation (changes to the layout of Rosefield Solar Farm and/or construction methods or amended foundation design or use of above ground/surface mounted cabling), it is anticipated that additional mitigation to off-set adverse impacts will take the form of a programme of archaeological investigation and recording, secured by a DCO requirement. Such a programme may include pre-commencement phases of archaeological investigation (trial trenching) and/or archaeological 'watching brief' during construction or pre-commencement formal excavation where appropriate. The need for, and scope of such mitigation, will be agreed with the Buckinghamshire Council archaeological advisor and Historic England, where necessary. The scope and methodology of the mitigation will be set out in an Outline Written Scheme of Investigation that will be submitted in support of the DCO application.

9.11.3. An Outline Construction Environmental Management Plan will be submitted in support of the DCO application. This will include mitigation measures to protect the physical remains of in-situ designated heritage assets, such as scheduled monuments and listed buildings. This may include measures such as the installation and maintenance of fencing around designated heritage assets during construction works. Toolbox talks to inform site contractors of these measures and the procedure to follow in case of archaeological remains being exposed will also be produced and distributed.

Operational (including maintenance) phase

9.11.4. An Outline Operational Environmental Management Plan will be submitted in support of the DCO application. The Outline Operational Environmental Management Plan will include mitigation to minimise the risk of potential impacts to the settings of heritage assets during the operational (including maintenance) phase. This will include design measures to minimise impacts to settings attributes that may arise from security lighting, operational noise and associated traffic. Furthermore, an Outline Soil Management Plan will be submitted in support of the DCO application which will include measures to avoid direct physical impacts to archaeological remains as a result of changes in soil moisture content.

Decommissioning phase

9.11.5. Although the decommissioning methodology is not yet finalised, the effects of decommissioning are often similar to, or to a lesser magnitude, than the construction effects.

9.11.6. No new infrastructure is expected to be required within the Site boundary during decommissioning phase. No physical impacts to known or potential heritage assets are therefore anticipated to arise from this. Although decommissioning groundworks associated with activities, such as the removal of the Solar PV modules and landscaping, may create physical impacts to known or potential heritage assets within the Site boundary, these are anticipated to be of a lower magnitude than physical impacts to these assets during the construction phase.

9.11.7. It is expected that mitigation against any likely significant effects on heritage assets within the Site boundary during the construction phase will be sufficient to avoid significant effects on in situ archaeological remains during the decommissioning phase. It is not expected that any new infrastructure or construction activities requiring groundworks (such as access roads and landscaping) will need to be established or carried out within the vicinities of the heritage assets deemed as vulnerable to changes in their settings by Rosefield Solar Farm during the decommissioning phase. Furthermore, decommissioning works will be undertaken following the principles laid down in the Outline Decommissioning Environmental Management Plan that will be submitted in support of the DCO application, further reducing the likelihood of significant physical effects to in situ archaeological remains or significant effects resulting from changes in the setting of heritage assets during this phase.

9.12. Assessment of residual effects (with additional mitigation)

9.12.1. The likely residual significant effects of Rosefield Solar Farm on the cultural heritage resource, taking into account the embedded and additional mitigation measures outlined in **Sections 9.7** and **9.11**, are presented in **Table 9.8** below.

9.12.2. The embedded and additional measures are considered to be sufficient to ensure physical effects on any known or potential heritage assets within the Site boundary are **not significant**.

9.12.3. It is acknowledged that the temporary removal of the setting attribute of tranquillity during the construction and operational (including maintenance) phases of Rosefield Solar Farm, arising from increased noise, dust and/or lighting associated with construction and operational (including maintenance) activities, is possible for heritage assets Claydon House (NHLE 1288461), Claydon Registered Park and Garden (NHLE 1000597), Finemerehill House (NHLE 1117815), Pond Farmhouse (NHLE 1214849), and Dry Leys Farmhouse (NHLE 1319271). Such effects are considered to be **significant** or **potentially significant**.

9.12.4. **No significant** effects are anticipated during the decommissioning phase. This includes physical impacts to in situ archaeological remains arising from decommissioning activities, as is discussed in **Section 9.11**.

Table 9.8 – Likely residual significant effects of the Rosefield Solar Farm on cultural heritage assets

Asset	Residual effect	Asset importance	Magnitude of impact	Significance of effect	Phase effect is anticipated
Claydon House (NHLE 1288461)	Partial loss of designed and/or key views between the asset and Rosefield Solar Farm and setting attribute of surrounding rural landscape character.	High	Minor	**Up to moderate adverse – Potentially significant**	Construction and operation (including maintenance)
Claydon Registered Park and Garden (NHLE 1000597)	Partial loss of designed and/or key views between the asset and Rosefield Solar Farm and setting attribute of surrounding rural landscape character.	Medium	Minor	**Slight adverse – Not significant**	Construction and operation (including maintenance)
Finemerehill House (NHLE 1117815)	Partial loss of setting attributes of surrounding rural landscape character, separation from present day urban occupation and industrial or economic activity during construction and operation (including maintenance).	Medium	Up to Moderate	**Up to moderate adverse - Potentially significant**	Construction and operation (including maintenance)

Asset	Residual effect	Asset importance	Magnitude of impact	Significance of effect	Phase effect is anticipated
Pond Farmhouse (NHLE 1214849)	Partial loss of setting attributes of surrounding rural landscape character, separation from present day urban occupation and industrial or economic activity during construction and operation (including maintenance).	Medium	Up to Moderate	**Up to moderate adverse - Potentially significant**	Construction and operation (including maintenance)
Dry Leys Farmhouse (NHLE 1319271)	Partial loss of setting attributes of surrounding rural landscape character, separation from present day urban occupation and industrial or economic activity during construction and operation (including maintenance).	Medium	Up to Moderate	**Up to moderate adverse - Potentially significant**	Construction and operation (including maintenance)
Middle Claydon Conservation Area	Partial loss of setting attributes of surrounding rural landscape character, separation from present day urban occupation and industrial or economic activity during construction	Medium	Up to Moderate	**Up to moderate adverse - Potentially significant**	Construction and operation (including maintenance)

Asset	Residual effect	Asset importance	Magnitude of impact	Significance of effect	Phase effect is anticipated
	and operation (including maintenance).				
Botolph Claydon Conservation Area	Partial loss of setting attributes of surrounding rural landscape character, separation from present day urban occupation and industrial or economic activity during construction and operation (including maintenance).	Medium	Up to Moderate	**Up to moderate adverse - Potentially significant**	Construction and operation (including maintenance)
Catherine Farm (HER Reference: MBC26340)	Partial loss of setting attributes of surrounding rural landscape character, separation from present day urban occupation and industrial or economic activity during construction and operation (including maintenance).	Medium	Up to Moderate	**Up to moderate adverse - Potentially significant**	Construction and operation (including maintenance)

9.13. Opportunities for enhancement

9.13.1. Knowl Hill will become accessible through a new permissive footpath, this will allow Claydon House to be appreciated from a key vantage point and will be an enhancement to this heritage asset.

9.13.2. Discussions are ongoing with statutory consultees about potential enhancements at key locations around the site, so that the heritage significance of the heritage assets can be better appreciated and understood.

9.13.3. Discussion is also ongoing regarding other potential measures to enhance the historic environment and collaboration regarding enhancements will be sought with the National Trust.

9.14. Difficulties and uncertainties

9.14.1. The following difficulties and uncertainties have been encountered in undertaking this preliminary assessment:

- The information provided in this PEIR is preliminary and is based on the information available at the time of writing. A full assessment of likely significant effects will be reported in the ES;
- Not all heritage assets have been previously identified in the HER; the desk-based assessment has considered the potential for currently unknown remains and this is being further evaluated through geophysical survey;
- The geophysical survey has not yet been completed and there are therefore areas of uncertainty regarding archaeological potential across parts of the Site. The geophysical survey will be completed to inform the ES; and
- Not all archaeological remains can be detected by geophysical survey, and it is noted that the geology of the Site and surrounding area is known to sometimes prevent detection of archaeological remains. A programme of targeted trial trenching will inform the ES and limit the remaining uncertainties regarding archaeological potential.

9.15. Further work to inform the ES

9.15.1. To form a robust ES, the following work is proposed so that all aspects will be suitably considered:

- Completion of geophysical surveys;
- Aerial Investigation and Mapping report (AIM)
- Detailed setting assessment visits to heritage assets predicted to experience significant effects; and
- Targeted trial trenching.

10. Land, Soil and Groundwater

10.1. Introduction

10.1.1. This chapter presents a preliminary assessment of the likely significant effects arising from the construction, operation (including maintenance) and decommissioning of Rosefield Solar Farm upon land, soil and groundwater and should be read in conjunction with the following figures and appendices in **Volume 2** and **Volume 3**, respectively:

- **Figure 10.1: Study Area for Land, Soil and Groundwater;**
- **Figure 10.2: Agricultural Land Classification Plan;**
- **Figure 10.3: Mineral Safeguarding Areas;**
- **Appendix 10.1: Agricultural Land Classification (ALC) Report;** and
- **Appendix 10.2: Preliminary Risk Assessment (Phase 1 Desk Study).**

10.2. Stakeholder engagement

10.2.1. **Table 10.1** provides a summary of the engagement undertaken to date to inform this preliminary assessment.

Table 10.1 – Engagement undertaken to date

Consultee	Date and method	Key matters discussed
Environment Agency	6 February 2024 Microsoft Teams call	Inception meeting with National Infrastructure Planning Team members and the DCO account manager to discuss the methodology of the ALC survey that had been undertaken.
Natural England	15 March 2024 Email	Email confirming agreement with a semi-detailed survey (1 auger per 2 hectares (ha) plus representative pits) where the Site is expected to comprise non-Best and Most Versatile (BMV) land. However, a detailed survey is expected for areas of BMV land. The Applicant confirmed that this approach has been taken to date.
Buckinghamshire Council	11 June 2024 Email	Initial engagement email issued to soil and agricultural land lead to request further engagement. No response has been received to date.

10.3. Legislative framework, planning policy and guidance

10.3.1. This preliminary assessment has been undertaken with regard to the following legislation, planning policy and guidance.

Legislation

- Part IIA of the Environmental Protection Act 1990[1] provides a statutory regime for identifying and remediating contaminated land;
- The Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009[2] covers the management and protection of water resources. It includes requirements to ensure sustainable use of water, prevent pollution and regulate activities that could affect availability or quality of water;
- The Water Framework Directive 2000/60/EC[3] establishes a framework for action relating to water policy;
- The Groundwater Directive 2006/118/EC[4] relates to the protection of groundwater from pollution and aims to reduce deterioration in quality;
- The Groundwater (Water Framework Directive) (England) Direction 2016[5] sets out obligations to protect groundwater;
- The Priority Substances Directive 2008/105/EC[6] relates to environmental quality standards for water; and
- The Environmental Permitting (England and Wales) Regulations 2016[7], provide a structure for overseeing activities which have the potential to harm human health or the environment.

[1] Environmental Protection Act 1990. Available online: https://www.legislation.gov.uk/ukpga/1990/43/part/IIA (accessed 5 June 2024).
[2] The Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009. Available online: https://www.legislation.gov.uk/uksi/2009/3104/contents/made (accessed 5 June 2024).
[3] The Water Framework Directive 2000. Available online: [redacted] accessed 5 June 2024).
[4] The Groundwater Directive 2006. Available online: [redacted] (accessed 5 June 2024).
[5] The Groundwater (Water Framework Directive) (England) Direction 2016. Available online: https://www.gov.uk/government/publications/the-groundwater-water-framework-directive-england-direction-2016 (accessed 5 June 2024).
[6] The Priority Substances Directive 2008. Available online: [redacted] (accessed 5 June 2024).
[7] The Environmental Permitting (England and Wales) Regulations 2016. Available online: https://www.legislation.gov.uk/uksi/2016/1154/contents/made (accessed 5 June 2024).

National planning policy

- Overarching National Policy Statement for Energy (NPS EN-1) (2023)[8] – Section 5.11 relates to land use and includes details of planning policy relating to land contamination, soil and agricultural land;
- National Policy Statement for Renewable Energy Infrastructure (NPS EN-3)[9] (2023) – Section 2.10 considers issues relating to soil quality for solar development, including the consideration of land types on which schemes could be developed;
- National Policy Statement for Electricity Networks Infrastructure (NPS EN-5)[10] (2023) which details issues relating to underground cables, in connection with soil and contamination, although predominantly dealing with overhead cables; and
- National Planning Policy Framework (NPPF) (2023)[11] with reference to Section 15 'Conserving and enhancing the natural environment'.

Local planning policy

- Vale of Aylesbury Local Plan (VALP) 2013-2033[12], specifically paragraphs 3.63, and 3.66 to 3.68 and policy S7; and
- The Buckinghamshire Minerals and Waste Local Plan[13] includes issues relating to minerals (including Mineral Safeguarding Areas), soil

[8] Department for Energy Security and Net Zero. (2023). Overarching National Policy Statement for Energy (EN-1). Available online: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1

[9] Department for Energy Security and Net Zero (2023). National Policy Statement for Renewable Energy Infrastructure (EN-3). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3

[10] Department for Energy Security and Net Zero (2023). National Policy Statement for Electricity Networks Infrastructure (EN-5). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5

[11] Ministry of Housing, Communities and Local Government and Department for Levelling Up, Housing and Communities. (2023). National Planning Policy Framework. Available online: https://www.gov.uk/government/publications/national-planning-policy-framework--2

[12] Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021). Available online: https://buckinghamshire-gov-uk.s3.amazonaws.com/documents/Aylesbury_local_plan_L46JWaT.pdf

[13] Buckinghamshire Minerals and Waste Local Plan, 2019. Available online: [redacted] (accessed 5 June 2024).

(including agricultural land), groundwater (including source protection zone) and waste.

Guidance

- Land Contamination Risk Management (LCRM) (Environment Agency, 2023)[14];
- Institute of Environmental Management & Assessment Guide: A New Perspective on Land and Soil in Environmental Impact Assessment (IEMA, 2022)[15];
- Agricultural Land Classification for England and Wales: Revised Guidelines and Criteria for Grading the Quality of Agricultural Land (Ministry of Agriculture, Fisheries and Food (MAFF), 1988)[16];
- Technical Information Note TIN049: Agricultural Land Classification: protecting the best and most versatile agricultural land, 2nd edition (Natural England, 2012)[17]; and
- Likelihood of Best and Most Versatile Agricultural Land strategic scale maps (Natural England, 2017)[18].

10.4. Study area

10.4.1. The Study area for land, soil and groundwater is the area within and up to 1 km from the Site boundary. The Site boundary and the land, soil and groundwater Study area are shown in **Figure 10.1** in **Volume 2**.

10.4.2. The size of the Study area used for land, soils and groundwater is based on professional judgement and includes all features that may be impacted by the construction, operational (including maintenance) and decommissioning phases of Rosefield Solar Farm. For certain receptors, consideration has been afforded to their presence/absence up to 1 km

[14] Land Contamination Risk Management (LCRM), Environment Agency, 2023. Available online: https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm (accessed 5 June 2024).
[15] Institute of Environmental Management & Assessment Guide 2022. Available online: [redacted] (accessed 5 June 2024).
[16] Agricultural Land Classification for England and Wales 1988. Available online: [redacted] accessed 5 June 2024).
[17] Agricultural Land Classification: protecting the best and most versatile agricultural land 2009. Available online: [redacted] (accessed 5 June 2024).
[18] Likelihood of Best and Most Versatile Agricultural Land 2017. Available online: [redacted] (accessed 5 June 2024).

from the Site boundary, but the preliminary assessment does not necessarily provide details on every element in those instances where there are no potentially significant effects to consider. This is specified where relevant in **Section 10.6**.

10.5. Establishing baseline conditions

10.5.1. The following data sources have been used to understand the existing land, soil and groundwater conditions:

- Geological maps (bedrock and superficial geology) (British Geological Survey (BGS) mapping accessed online)[19];
- Hydrogeological and groundwater vulnerability maps (BGS database[20] and MAGIC maps)[21];
- Soil survey maps held by Department for Environment, Food & Rural Affairs (Defra)[22] and Natural England[23];
- Site-specific data and historical mapping from the supporting environmental database report[24] (providing details of features on or close to the Site relating to water, waste, hazardous substances, geology and land use);
- SoilScapes mapping[25]; and
- Mineral resources information from the Buckinghamshire Minerals and Waste Local Plan[26].

[19] BGS GeoIndex Onshore. Available online: [redacted] (accessed 5 June 2024).
[20] BGS GeoIndex Onshore. Available online: [redacted] (accessed 5 June 2024).
[21] MAGIC Maps portal. Available online: https://magic.defra.gov.uk/MagicMap.aspx accessed (5 June 2024).
[22] MAGIC Maps portal. Available online: https://magic.defra.gov.uk/MagicMap.aspx accessed (5 June 2024).
[23] Regional Agricultural Land Classification Maps 2010. Available online: [redacted] (accessed 5 June 2024).
[24] Envirocheck reports for main site area, and additional report for East Claydon substation area, provided in **Appendix 10.2** in **Volume 3** (report references 311552500_1_1 and 317083347_1_1, dated 19-05-2023 and 347702807_1_1, dated 22 May 2024).
[25] LandIS SoilScapes Viewer. Available online: [redacted] (accessed 5 June 2024).
[26] Buckinghamshire Minerals and Waste Local Plan, 2019. Available online: [redacted] accessed 5 June 2024).

10.5.2. An ALC survey has been undertaken and the survey report is presented in **Appendix 10.1** in **Volume 3**. There are several fields within the Site boundary where it has not yet been possible to undertake surveys (a total of 147 ha – refer to **Figure 10.2** in **Volume 2**). These areas will be surveyed to inform the ES.

10.5.3. A Preliminary Risk Assessment report has been prepared and is provided as **Appendix 10.2** in **Volume 3**. This report provides a desk-based analysis of Rosefield Solar Farm from a land, soil and groundwater perspective, and includes the results of a site reconnaissance survey.

10.6. Environmental baseline

Site history

10.6.1. A summary of the history is provided below in the context of land, soils and groundwater for the Study area.

10.6.2. Contamination associated with agricultural land use could include pesticides, herbicides, areas of made ground or infill around historical or current farm buildings or along the route of the former railway or farm tracks, infilled ponds, and possible areas of waste materials.

10.6.3. The Site is subdivided into four main land areas, referred to as Parcel 1, Parcel 1a, Parcel 2 and Parcel 3. There are also cable route search areas between Parcel 1 and Parcel 2, and between Parcel 2 and Parcel 3. The boundaries for these areas are shown in **Figure 10.1** in **Volume 2**.

Parcel 1

10.6.4. Within the Site boundary, on the earliest map from 1885, the land is shown separated into a number of small fields, generally comparable to the present day layout, with occasional small buildings, wells, springs and ponds shown to be present. There are no notable changes to land use or fields boundaries from the earliest available mapping to the present day.

10.6.5. Within the Study area, but outside the Site boundary for Parcel 1, the land is shown as small fields on the earliest map (1885), with some areas of woodland, farm buildings and tracks/roads. Within the western section of the Study area around Parcel 1, a railway is present from the 1900 map (200 m from the Site boundary, still present). A large brickworks is marked at Calvert from the 1952 map (partly within and partly outside the Study area), which is located to the west of the railway. Parts of Calvert Brickworks are later shown to have been infilled and reinstated as agricultural land (from 1984 to 1999), and later redeveloped with residential properties. Parts of the land associated with the brickworks that are within the Study area are known to have been used as a landfill.

Parcel 1a

10.6.6. The earliest map (1885) shows the land within the Site boundary for Parcel 1a as a main large field, with smaller fields in the west and south-east. A stream is located along the west and north boundaries of this Parcel. A track is later shown to be present across the centre of Parcel 1a (on the 1900 map). The current map (2023) does not show any significant alterations compared to the 1900 map.

10.6.7. Within the Study area, but outside the Site boundary for Parcel 1a, the land is a combination of fields, woodland areas and roads, including Romer Wood, Greatsea Wood and Sheephouse Wood. A railway line is present south-west of Parcel 1a by 1900 (as noted above).

Parcel 2

10.6.8. Within the Site boundary for Parcel 2, mapping from 1885 shows the land separated into small fields, with buildings present at Kitehill Farm, Coppice Lowhill Farm, Bernwood Farm and Claydon Lawn. Other features present include a stream, tracks, woodland, ponds and a well. Changes to field boundaries are noted by mapping from 1984, and all but one of the buildings are absent by this time (the remaining building is at Coppice Lowhill Farm). The well is shown to be covered by the map from 1999.

10.6.9. Within the Study area, but outside the Site boundary for Parcel 2, an airfield is located to the north (operating since 2005, currently used by a model aircraft club) as is the village of Botolph Claydon. Hogshaw Farm is to the east, and elsewhere there are fields and small woodland areas.

Parcel 3

10.6.10. Within the Site boundary for Parcel 3, the earliest map from 1885 shows that Parcel 3 was occupied by small fields, crossed by a railway running north to south. A small building was evident at Sion Hill Farm Crossing, with a stream, tracks and ponds also present. By 1900, a drain is indicated in the south-east corner of Parcel 3. The map from 1966 shows the railway to be disused, and it is no longer shown on the map from 1984. The small building is also absent by 1984, and an overhead electricity line is marked, roughly aligned with the route of the historical railway. The map from 1985 shows the presence of the large substation at East Claydon, within the northern part of the land parcel, and additional overhead electricity cables.

10.6.11. Within the Study area, but outside the Site boundary for Parcel 3, the surrounding land is generally agricultural, with no major changes shown from the earlier map editions to the present day. Winslow Road Station buildings are located to the north of the Site boundary.

Cable route search area between Parcels 1 and 2

10.6.12. Within the Site boundary for the cable route search area between Parcels 1 and 2, from the earliest map in 1885, the land is occupied by small fields, with some tracks and ponds. A windpump is present on the map from 1952, which is absent by 1984.

10.6.13. Within the Study area, but outside the Site boundary for this cable route search area, the surrounding area is made up of fields, woodland and tracks/roads.

Cable route search area between Parcels 2 and 3

10.6.14. Within the Site boundary for the cable route search area between Parcels 2 and 3, the earliest map from 1885 shows small fields, a possible pit feature, buildings, tracks and ponds. By 1900, Granborough Road railway station is present within this area, but is no longer marked on the map from 1966.

10.6.15. Within the Study area, but outside the Site boundary, no features of note were recorded.

Summary

10.6.16. In terms of historical site usage, the majority of the land within the Study area has been in use for agricultural purposes since the earliest historical mapping from 1885. Ponds, streams and tracks are common across all land areas, and a possible pit was noted in one location, which may have been infilled over time.

10.6.17. Notable features include a historical railway line within Parcel 3, and historical buildings in Parcels 1, 2 and 3. A railway station building was present in Parcel 3 (Granborough Road) and a large substation remains present in the northern section of Parcel 3.

Animal burial sites

10.6.18. There is no official register of animal burial sites and therefore it is not possible to assess whether there are any within the Study area. Due to the long-term agricultural site usage, it is a possibility that unrecorded animal burial pits could be present.

Unexploded ordnance

10.6.19. A review of publicly available unexploded ordnance (UXO) risk maps indicates that all land within the Study area has low potential for wartime bombs to be present (further detail is included within **Appendix 10.2** in **Volume 3**).

Information from environmental database report

10.6.20. Relevant information from the environmental database search is summarised below for the Study area. Data relating to discharge consents was reviewed for the full Study area, but only entries within 250 m of the Site boundary are detailed below, as more distant entries were reviewed, and were not considered to be within influencing distance of the Site.

- Calvert landfill site (pits 4, 5 and 6) is located approximately 200 m west from the Site boundary and is currently licensed for the recovery/disposal of non-hazardous waste;
- Greatmoor Waste Facility is located approximately 640 m to the south-west of Parcel 1a, with an active licence for the incineration of non-hazardous waste;
- Historical landfills are present approximately 240 m to the north-east of land Parcel 1 (Calvert landfill pit 1); 490 m to the north-west of Parcel 1 (Buckingham Rural District Council Refuse Tip); and 995 m to the west of land Parcel 1 (Brill Road Tip);
- The area occupied by the National Grid East Claydon Substation within Parcel 3 is shown as potentially infilled land;
- The completed sections of Calvert landfill site are identified as potentially infilled land;
- Current discharge consents include two within 250 m of Parcel 1 (for discharge of final effluent from domestic properties); three within 250 m of Parcel 2 (two final effluents from a farm and domestic property and one a trade discharge from a farm); and two in Parcel 3 (final effluent and trade effluent from the substation);
- The cable route search area between Parcels 1 and 2 includes two active discharge consents for domestic effluent, both at Muxwell Farm, and two within 250 m of the Site boundary (both for domestic effluent at Knowlhill Farm);
- The cable route search area between Parcels 2 and 3 has two active discharge consents within 250 m to the west of the Site boundary, at Borshaw Farm, for domestic effluent; and
- There is a slurry bed located at Borshaw Farm, west of the Site boundary, adjacent to the cable route search area between Parcels 2 and 3.

Site geology

10.6.21. Within the Site boundary, made ground is identified on geological mapping as being present in the area around the National Grid East Claydon Substation, within Parcel 3. Made ground is potentially also present in localised areas associated with infilled ponds or pits, farm buildings or tracks, but there is no indication that extensive areas of artificial ground would be present. Made ground outside of the Site boundary, but within

the Study area, is present, associated with the pits/landfills located at Calvert.

10.6.22. The bedrock geology across all parts of the Study area is composed of units from the Mercia Mudstone Group including the West Walton Formation, the Weymouth Mudstone Member, the Stewartby Member and the Peterborough Member.

10.6.23. The superficial geological units across the Study area comprise alluvium, till, glacial deposits and glaciofluvial deposits. Although specific peat deposits are not indicated on the geological mapping, some peat deposits may be present within the alluvium.

10.6.24. Depths to the mudstone bedrock are not widely recorded. On one of the BGS borehole records (located between Home Wood and Parcel 1), the top of bedrock is indicated to be at 0.2 m (overlain only by topsoil).

Geological hazards

10.6.25. Details are provided below relating to potential geological hazards within the Study area. The hazards identified in this section are not land, soil or groundwater receptors, but are potential hazards that will require consideration during the design works and construction (and potentially operation (including maintenance) and decommissioning) of Rosefield Solar Farm. As such, there would not be likely significant effects that are relevant to geological hazards, but issues to take into account as design and survey work progress:

- shrinkable clay soils, highly compressible units or low bearing capacity soils (including peat and soft clay) could be present within superficial units;
- silt-rich soils susceptible to rapid loss of strength in wet conditions could be present within alluvium;
- the environmental database report indicates that landslides may be a risk in some areas of the Site;
- filled and made ground are expected to be present, including at embankments, infilled ponds and infilled pits;
- varying Site levels are present in some locations; and
- a high groundwater table is expected to be present due to geological conditions and the fact that the Site is recorded to be potentially susceptible to flooding from groundwater.

Site designated for their geological importance

10.6.26. There are no geological Sites of Special Scientific Interest (SSSIs) or Geological Conservation Review Sites within the Study area.

Mining and quarrying

10.6.27. The Study area is not within a part of the country where coal mining deposits are located. Data from the environmental database report indicates that there are no recorded mineral extraction sites onsite or within 250 m of the Site boundary, with the exception of Calvert Brickworks (as noted in **paragraph 10.6.20**). Sites further than 250 m from the Site boundary were reviewed as part of the baseline assessment but were concluded to be highly unlikely to influence Rosefield Solar Farm. One small feature was identified on historical mapping that could represent a pit, but this was not present beyond the mapping from 1883.

Mineral safeguarding areas

10.6.28. There are Mineral Safeguarding Areas which cover some of the Study area, relating to the presence of alluvial deposits along watercourses, as detailed below and presented in **Figure 10.3** in **Volume 2**.

- Parcel 1: Small section in the north-eastern corner, associated with the minor watercourse located on the Site boundary;
- Parcel 1a: A Mineral Safeguarding Area is present in most of Parcel 1a, associated with the watercourse on the western and northern boundary;
- Parcel 2: Sections of two fields in the north-western area (Fields D3 south and D12), an area near Borshaw Farm (Fields D8, D9 and sections of Fields D17, D18 and D19) and a small section of one field in the south (Field D31);
- Parcel 3: The majority of Parcel 3 is covered by a Mineral Safeguarding Area;
- Cable route search area between Parcels 1 and 2: Mineral Safeguarding Area is present in the north-west and north-eastern area and between Parcel 1 and Parcel 1a; and
- Cable route search area between Parcels 2 and 3: A Mineral Safeguarding Area is located adjacent to the Claydon Brook.

Soil

10.6.29. A summary is provided below of the dominant soil properties within each Parcel and cable route search area. These details relate to the Site boundary only, as soil survey work covered the specific fields within the Site boundary, and does not incorporate adjoining land.

- Parcels 1, 1a and 3: dark greyish brown inorganic clay topsoil over light brown clay subsoil;
- Parcel 2: similar soils as in Parcels 1, 1a and 3, except a variation to the south of Botolph Claydon, where soils are dark grey clay, clay loam or sandy clay loam topsoil over a dark greyish brown or grey sandy clay loam upper subsoil and sandy clay loam lower subsoil; and

- Cable route search areas (data taken from indicative regional mapping, not site-specific sampling): slowly permeable acid loamy and clayey soil with smaller areas of lime-rich loamy and clayey soils.

Agricultural land classification (ALC)

10.6.30. As with soil, this section considers only the land within the areas of Parcel 1, Parcel 1a, Parcel 2 and Parcel 3, and fields within the cable route search area. There are several fields within the Site boundary where it has not yet been possible to undertake surveys (a total of 147 ha – refer to **Figure 10.2** in **Volume 2**). These areas will be surveyed to inform the ES.

10.6.31. The following approximate percentages of soil grades have been recorded within the Site boundary to date, as shown in **Figure 10.2** in **Volume 2**:

- Grade 1 (excellent quality agricultural land) - none present;
- Grade 2 (very good quality) – 0.5% (3.0 ha);
- Grade 3a (good quality) – 1.2% (7.0 ha);
- Grade 3b (moderate quality) - 98% (576.4 ha);
- Grade 4 (poor quality) - none present; and
- Non-agricultural land – 0.3% (1.5 ha).

10.6.32. Land that is classified as ALC Grade 1, Grade 2 or Grade 3a is considered to be BMV land. BMV land (Grade 2 and 3a) accounts for approximately 1.7% of the Site (10.0 ha) with the rest of the Site (except for the remaining fields to be surveyed) considered to be non-BMV land (577.9 ha). These figures will be updated within the ES, when the remaining 147 ha area has been surveyed. However, given the soil types mapped on the land that has been surveyed, the Applicant anticipates the unsurveyed areas to be entirely, or almost entirely, non-BMV land.

Groundwater

10.6.33. The Study area is underlain by superficial geological units that are classified as a secondary A aquifer and a secondary undifferentiated aquifer. The mudstone bedrock is classified as unproductive strata, meaning that it does not contain significant volumes of groundwater.

10.6.34. Local British Geological Society borehole records do not include details of depths to groundwater within the Study area, therefore, site-specific information on this is not available. However, a high groundwater table would be anticipated in some areas of the Study area, based on the geological conditions.

10.6.35. There are currently no licensed groundwater abstractions within the Study area.

10.6.36. With respect to source protection zones (SPZ) for the protection of groundwater, none are present within the Study area.

Future baseline

10.6.37. If Rosefield Solar Farm is not progressed, the future baseline with respect to land, soil and groundwater is not expected to be significantly impacted. It is anticipated that agricultural use of the land within the Site would continue, so there may be some minor associated degradation in soil quality. The geological and hydrogeological units would not be expected to change significantly, and no significant changes to mineral resources are expected to occur.

10.7. Mitigation embedded into the design

10.7.1. This preliminary assessment has been based on the principle that measures have been 'embedded' into the design of Rosefield Solar Farm to remove potential likely significant environmental effects as far as practicable, for example by the considered placement of infrastructure. Embedded (primary) environmental mitigation measures that are considered to be an inherent part of Rosefield Solar Farm are detailed within **Chapter 5: Approach to the EIA**. The embedded mitigation measures relevant to land, soil and groundwater and the benefits these provide are outlined in **Table 10.2** below.

Table 10.2 – Embedded mitigation measures relevant to land, soil and groundwater

Embedded mitigation measures relevant to land, soil and groundwater	Benefit
Site location has been selected to avoid BMV land as far as possible.	Limit impacts to BMV land.
Internal access tracks and cable routes would use existing tracks, crossings and/or gaps in the hedgerows where reasonably practicable.	Where this is achieved, no further disturbance of hedgerows would be required, preventing additional disruption to existing soil horizons, habitats and ecosystems.
The cable routes would comprise underground cables – cabling routes will run alongside access tracks as much as possible to avoid wider excavations. Minimise the use of concrete, trenches and foundations.	Minimise impacts on soil (including BMV land) and geological units.
Minimum offset of least 10 m either side of Main Rivers, and 6 m from ditches and	This embedded mitigation has the added benefit of avoiding parts of the Minerals Safeguarding Areas present

Embedded mitigation measures relevant to land, soil and groundwater	Benefit
ordinary watercourses, to all fence lines within Rosefield Solar Farm. Where crossing points are required over Main Rivers or ordinary watercourses, these will be designed to minimise effects on floodplain and any biodiversity interest associated with the watercourse.	within the Site boundary. For the Rosefield Solar Farm, Mineral Safeguarding Areas correspond to the presence of alluvium, which is associated with watercourses. An off-set to protect the water resources will also mean that mineral reserves are not impacted.

10.8. Optionality

10.8.1. **Chapter 5: Approach to the EIA** sets out those elements of Rosefield Solar Farm for which optionality is present within the current design and sets out the scenarios assessed for the purpose of this PEIR.

10.8.2. The preliminary design principles as outlined in **Chapter 5: Approach to the EIA** and preliminary parameter plans (**Figures 3.1** to **3.5** in **Volume 2**) set out the reasonable 'worst case scenario' that has been assessed within this chapter. The 'worst case scenario' options in relation to this preliminary land, soil and groundwater assessment are described in **Table 10.3** below.

Table 10.3 – Optionality scenarios assessed

Project element	Scenario assessed for this preliminary assessment
Satellite Collector Compounds	This preliminary assessment has considered the siting of the Satellite Collector Compound in Parcel 1 within either Field B10 or Field B23, as it is considered likely that there will be no significant difference in effects relating to land, soil and groundwater with either scenario. For the same reason, all three field options (Fields D8, D9 and D17) are considered for the location of the Satellite Collector Compound in Parcel 2.
Main Collector Compound	The four fields that are being considered for the Main Collector Compound have all been taken into consideration within this preliminary assessment, as it is considered likely that there will be no significant difference in effects relating to land, soil and groundwater with either scenario.
BESS	This preliminary assessment considers both Scenario 1 and Scenario 2 for the location of the BESS, as it is considered likely that there will be no significant

Project element	Scenario assessed for this preliminary assessment
	difference in effects relating to land, soil and groundwater with either scenario.
Rosefield Substation	This preliminary assessment considers both Scenario 1 and Scenario 2 with respect to the Rosefield Substation location, as it is considered likely that there will be no significant difference in effects relating to land, soil and groundwater with either scenario.
Cable route to connect the Solar PV Modules, BoSS, Collector Compounds, Rosefield Substation and BESS	For the purposes of this preliminary assessment, both of the cable route options have been considered, as it is considered likely that there will be no significant difference in effects relating to land, soil and groundwater with either scenario.
BoSS	This preliminary assessment assumes the BoSS to be located independently outdoors and central inverters would be used as this is considered to be the worst case scenario for land, soils and groundwater as these would both require hardstanding bases.
Construction Compounds	For the purposes of this preliminary assessment, all suitable locations proposed for the Main and Satellite Construction Compounds have been considered, as it is considered likely that there will be no significant difference in effects relating to land, soil and groundwater.

10.9. Approach to the preliminary assessment

10.9.1. For this preliminary assessment, the likely significant effects on identified receptors are reported based on the information available at the time of writing. The final assessment of likely significant effects will be reported in the ES.

10.9.2. A Minerals Safeguarding Assessment, to assess impacts to Mineral Safeguarding Areas (including any potential impact to loss of access to mineral resources during the lifetime of Rosefield Solar Farm), does not form part of this preliminary assessment but will be reported within the ES once further baseline information has been obtained and further consultation with Buckinghamshire Council has been undertaken.

10.9.3. A Preliminary Risk Assessment has been completed for Rosefield Solar Farm (see **Appendix 10.2** in **Volume 3**). This provides baseline data on the Study area, alongside an assessment of risks relating to human receptors, controlled waters and other sensitive receptors. This work is undertaken in line with the technical approach presented in LCRM and in

general accordance with British Standard (BS) 10175: 2011 + A2 2017[27]. The Preliminary Risk Assessment report provided in **Appendix 10.2** in **Volume 3** includes coverage of the site history, geology, hydrogeology, hydrology, and other issues. A site walkover has been completed as part of this preliminary assessment.

10.9.4. The assessment criteria for land, soils and groundwater adopted for this preliminary assessment are detailed below. It should be noted that some of these criteria differ from the criteria proposed within Appendix D of the EIA Scoping Report, with an updated approach that provides additional robustness in terms of assessing the soil and agricultural land.

Receptor sensitivity relating to potential contamination

10.9.5. There are no published guidelines or criteria for assessing and evaluating effects on geology, hydrogeology or soil within the context of an EIA. The sensitivity criteria used in this preliminary assessment have therefore been derived from the Construction Industry Research and Information Association (CIRIA) document Contaminated land risk assessment, A guide to good practice (C552)[28]. The IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment[29] has also been referred to when producing the definitions for receptor sensitivity. Sensitivity criteria are presented in **Table 10.4**.

Table 10.4 – Receptor sensitivity relating to potential contamination

Sensitivity	Definition
Very High	The receptor is highly sensitive and could be easily damaged by activities associated with Rosefield Solar Farm. The receptor is likely to be of national significance. The recovery of the receptor is either impossible or very long-term.

[27] Land Contamination Risk Management (LCRM), Environment Agency, 2023. Available online: https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm (accessed 5 June 2024).
[28] Rudland, D. J., Lancefield, R. M. and Mayell, P. N. (2001). Contaminated land risk assessment, A guide to good practice (C552). Construction Industry Research and Information Association.
[29] Institute of Environmental Management & Assessment Guide 2022. Available online: [redacted] (accessed 5 June 2024).

Sensitivity	Definition
High	The receptor is of high sensitivity and is of importance at a local or regional level. The receptor is vulnerable to the effects of Rosefield Solar Farm and recovery would be slow and/or costly (e.g., remedial measures to groundwater may be required to prevent a wider impact).
Medium	The receptor is of medium value and is likely to be of local importance. The receptor is slightly vulnerable to impacts from Rosefield Solar Farm and would be expected to recover over a moderate timescale (e.g., up to five years for groundwater to return to its current or an improved condition).
Low	The receptor is of low value and has little contribution to local, regional or national resources. The receptor is not generally vulnerable to impacts that may arise from Rosefield Solar Farm and/or will recover over a short timescale (e.g., up to 1 year before groundwater returns to its current or improved condition).
Negligible	The receptor is of negligible positive value. The receptor is not vulnerable to impacts that may arise from Rosefield Solar Farm and/or will recover quickly.

Receptor sensitivity relating to soils and agricultural land

10.9.6. Sensitivity criteria for soils and agricultural land, derived from the IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment[30], are presented in **Table 10.5**. For Rosefield Solar Farm, the ALC Grades have been used as the determining factor for receptor sensitivity.

[30] Institute of Environmental Management & Assessment Guide 2022. Available online: [redacted] (accessed 5 June 2024).

Table 10.5 – Receptor sensitivity relating to soils and agricultural land

Sensitivity (in-situ soils)	Soil resource
Very High	Biomass production: ALC Grades 1 & 2 or Land Capability for Agriculture (LCA) Classes 1 & 2. Ecological habitat, soil biodiversity and platform for landscape: Soils supporting protected features within a European site (e.g., SAC, SPA, Ramsar); Peat soils; Soils supporting a National Park, or Ancient Woodland. Soil carbon: Peat soils. Soils with potential for ecological/landscape restoration. Soil hydrology: very important catchment pathway for water flows and flood risk management. Archaeology, cultural heritage, community benefits and geodiversity: Scheduled Monuments and adjacent areas; World Heritage and European designated sites; Soils with known archaeological interest; Soils supporting community/recreational/educational access to land covered by National Park designation. Source of materials: Important surface mineral reserves that would be sterilised (i.e., without future access).
High	Biomass production: ALC Grade 3a, or LCA Grade 3.1. Ecological habitat, soil biodiversity and platform for landscape: Soils supporting protected features within a UK designated site (e.g., UNESCO Geoparks, SSSI or Protected Landscapes, Special Landscape Area, and Geological Conservation Review sites); Native Forest and woodland soils; Unaltered soils supporting semi-natural vegetation (including priority habitats). Soil carbon: Organo-mineral soils (e.g., peaty soils). Soil hydrology: Important catchment pathway for water flows and flood risk management. Archaeology, cultural heritage, community benefits and geodiversity: Soils with probable but as yet unproven (prior to being revealed by construction) archaeological interest; Historic parks and gardens;

Sensitivity (in-situ soils)	Soil resource
	Regionally Important Geological and Geomorphological Sites (RIGS); Soils supporting community /recreational/educational access to RIGS and Protected Landscapes. Source of materials: Surface mineral reserves that would be sterilised (i.e. without future access).
Medium	Biomass production: ALC Grade 3b or LCA Grade 3.2. Ecological habitat, soil biodiversity and platform for landscape: Soils supporting protected or valued features within non-statutory designated sites (e.g., Local Nature Reserves, Local Geological Sites, Sites of Nature Conservation Importance, Special Landscape Areas; Non-Native Forest and woodland soils. Soil carbon: Mineral soils. Soil hydrology: Important minor catchment pathway for water flows and flood risk management. Archaeology, Cultural heritage, community benefits and geodiversity: Soils with possible but as yet unproven (prior to being revealed by construction) archaeological interest; Soils supporting community/recreational/educational access to land. Source of materials: surface mineral reserves that would remain accessible for extraction.
Low	Biomass production: ALC Grades 4 & 5 or LCA Grades 4.1 to 7 or Urban soils. Ecological habitat, soil biodiversity and platform for landscape: Soils supporting valued features within non-designated notable or priority habitats/landscapes. Agricultural soils. Soil carbon: Mineral soils. Soil hydrology: Pathway for local water flows and flood risk management. Archaeology, cultural heritage, community benefits and geodiversity: Soils supporting no notable cultural heritage, geodiversity nor community benefits; Soils supporting limited community/recreational/ educational access to land.

Sensitivity (in-situ soils)	Soil resource
	Source of materials: Surface mineral reserves that would remain accessible for extraction.
Negligible	As for low sensitivity, but with only indirect, tenuous, and unproven links between sources of impact and soil functions.

Magnitude of impact relating to potential contamination

10.9.7. Where an impact is considered to be likely to occur as a result of Rosefield Solar Farm being constructed, operated and/or decommissioned, the magnitude of impact has been classified using the criteria presented in **Table 10.6**. These are also derived from CIRIA's Contaminated Land Risk Assessment (A guide to good practice) C552[31]. The IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment[32] has also been referred to in determining definitions for magnitude of impact.

Table 10.6 – Magnitude of impact criteria relating to potential contamination

Magnitude of impact	Definition
Major	These impacts are likely to be important considerations at a regional or district scale, and if adverse, are potential concerns, depending upon the relative importance attached to the issue during the decision-making process. Mitigation measures and detailed design work are unlikely to remove all the impacts upon the affected communities or interests. Examples include short-term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA[33], short-term risk of pollution of sensitive water resources; catastrophic damage to buildings or

[31] Rudland, D. J., Lancefield, R. M. and Mayell, P. N. (2001). Contaminated land risk assessment, A guide to good practice (C552). Construction Industry Research and Information Association.
[32] Institute of Environmental Management & Assessment Guide 2022. Available online: [redacted] (accessed 5 June 2024).
[33] Environment Protection Act 1990. Available online: https://www.legislation.gov.uk/ukpga/1990/43/contents (accessed 5 June 2024).

Magnitude of impact	Definition
	property; and short-term risk to an ecosystem or part of an ecosystem.
Moderate	These impacts, if adverse, while important at a local scale, are not likely to be key decision-making issues. The cumulative effect of such issues may lead to an increase in the overall impacts on a particular area or on a particular resource. They represent issues where impacts will be experienced but mitigation measures and detailed design work may ameliorate/enhance some of the consequences upon affected communities or interests. Some residual impacts will still arise. Examples include chronic damage to human health ('significant harm' as defined in 'Draft Circular on Contaminated Land'[34]); pollution of sensitive water resources; and significant change in an ecosystem or organism forming part of that ecosystem.
Minor	These impacts may be raised as local issues but are unlikely to be of importance in the decision-making process. Nevertheless, they are of relevance in the detailed design of Rosefield Solar Farm and consideration of mitigation or compensation measures. Examples include pollution of non-sensitive water resources; significant damage to crops, buildings, structures and services ('significant harm' as defined in 'Draft Circular on Contaminated Land'); and damage to sensitive buildings, structures or the environment.
Negligible	No change or a barely perceptible change from the baseline position. Examples include non-permanent human health impacts easily prevented by use of personal

[34] Department for Environment, Food and Rural Affairs. (2006). Defra Circular 01/2006 Environmental Protection Act 1990: Part 2A: Contaminated Land. Available online: https://assets.publishing.service.gov.uk/media/5a79c677e5274a684690c059/pb12112-circular01-2006-060817.pdf (accessed 5 June 2024).

Magnitude of impact	Definition
	protective clothing; and easily repairable damage to buildings, structures and services.
No change	No change from baseline conditions.

Magnitude of impact relating to soils and agricultural land

10.9.8. Where an impact is considered to be likely to occur as a result of Rosefield Solar Farm being constructed, operated and/or decommissioned, the magnitude of the impact is classified using the criteria presented in **Table 10.7**, which is derived from the IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment [35].

Table 10.7 – Magnitude of impact criteria relating to soils and agricultural land

Magnitude of impact (change)	Description of impacts restricting proposed land use
Major	Permanent, irreversible loss of one or more soil functions or soil volumes (including permanent sealing or land quality downgrading), over an area of more than 20 ha or loss of soil-related features, as advised by other factor specialists in the EIA team (including effects from 'temporary developments'*). *or* Potential for permanent improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of more than 20 ha, or gain in soil-related features, as advised by other factor specialists in the EIA team (including effects from 'temporary developments'*).
Moderate	Permanent, irreversible loss of one or more soil functions or soil volumes, over an area of between 5 ha and 20 ha or loss of soil-related features, as advised by other factor specialists in the EIA team (including effects from 'temporary developments'*). *or* Potential for improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of between 5 ha and 20 ha, or gain in soil-

[35] Institute of Environmental Management & Assessment Guide 2022. Available online: [redacted] accessed 5 June 2024).

Magnitude of impact (change)	Description of impacts restricting proposed land use
	related features, as advised by other factor specialists in EIA team.
Minor	Permanent, irreversible loss over less than 5 ha or a temporary, reversible loss of one or more soil functions or soil volumes, or temporary, reversible loss of soil-related features, as advised by other factor specialists in EIA team. *or* Potential for permanent improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of less than 5 ha or a temporary improvement in one or more soil functions due to remediation or restoration or off-site improvement, or temporary gain in soil-related features, as advised by other factor specialists in EIA team
Negligible	No discernible loss or reduction or improvement of soil functions or soil volumes that restrict current or proposed land use

** Temporary developments can result in a permanent impact if resulting disturbance or land use change causes permanent damage to soils.*

Significance of effect for land, soils and groundwater relating to potential contamination

10.9.9. The significance of effect is based on the sensitivity of the receptor and the magnitude of impact, as outlined in **Table 10.8**, derived from CIRIA's Contaminated Land Risk Assessment (A guide to good practice) C552[36] and with reference to the IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment[37]. The significance of effect can be either adverse or beneficial.

10.9.10. The significance of an effect is reported as either 'significant' or 'not significant'. Any effects that have been determined as 'moderate' or above

[36] Rudland, D. J., Lancefield, R. M. and Mayell, P. N. (2001). Contaminated land risk assessment, A guide to good practice (C552). Construction Industry Research and Information Association.
[37] Institute of Environmental Management & Assessment Guide 2022. Available online: [redacted] (accessed 5 June 2024).

are considered to be significant. Any effects that have been determined as 'low' or below are considered not significant. Where the significance matrix indicates a range for the effect significance (e.g. 'moderate/low'), professional judgement can be applied to select one option (which would be justified by evidence, as appropriate) or an effect significance range can be applied. If a significance of effect is assigned as 'moderate/low', this would be considered significant unless further information could be provided to downgrade the significance effect to 'low'.

Table 10.8 – Significance of effect criteria relating to potential contamination

Sensitivity	Magnitude of impact			
	Negligible	Minor	Moderate	Major
Negligible	Very Low	Very Low	Very Low	Low
Low	Very Low	Very Low	Low	Moderate/Low
Medium	Very Low	Low	Moderate/Low	Moderate
High	Low	Moderate/Low	Moderate	High
Very high	Moderate/Low	Moderate	High	Very High

Significance of effect for soils and agricultural land

10.9.11. The significance of effect is based on the sensitivity of the receptor and the magnitude of impact, as outlined in **Table 10.9**, which is derived from the IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment[38]. The significance of effect can be either adverse or beneficial.

10.9.12. The significance of an effect is reported as either 'significant' or 'not significant'. Any effects that have been determined as 'moderate' or above are considered to be significant. Any effects that have been determined as 'low' or below are considered not significant. Where the significance matrix indicates a range for the effect significance (e.g. 'slight or moderate'), professional judgement can be applied to select one option (which would

[38] Institute of Environmental Management & Assessment Guide 2022. Available online: [redacted] (accessed 5 June 2024).

be justified by evidence, as appropriate) or an effect significance range can be applied. If a significance of effect is assigned as 'slight or moderate', this would be considered significant unless further information could be provided to downgrade the significance effect to 'slight'.

Table 10.9 – Soils and agricultural land significance of effect criteria

Sensitivity	Magnitude of impact				
	No Change	Negligible	Minor	Moderate	Major
Negligible	Neutral	Neutral	Neutral	Neutral or Slight	Slight
Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
Very high	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large

10.10. Assessment of likely effects (without additional mitigation)

10.10.1. This section considers the effects that may arise during the construction, operation (including maintenance) and decommissioning phases of Rosefield Solar Farm in the absence of additional mitigation, taking into account the above embedded mitigation measures outlined in **Table 10.2** and assessing the reasonable worst case scenarios as outlined in **Table 10.3**.

10.10.2. The baseline review and risk assessment identified a number of potential risks that may result from Rosefield Solar Farm. These are summarised alongside the associated recommendations below. Full details are included in the PRA report (**Appendix 10.2** in **Volume 3**):

- Moderate to low risk to current or future site users due to build up of ground gases generated by waste in the current or historical landfill sites located at Calvert, potentially resulting in asphyxiation or explosion; and
- Moderate to low risk to Site buildings or infrastructure due to build up of ground gases generated by current or historical landfill sites at Calvert, potentially resulting in explosion.

Construction phase

10.10.3. With respect to effects on land contamination, construction activities could lead to localised contamination of soils from potential spills from construction plant during operation or refuelling activities.

10.10.4. If contaminated soils associated with past developments are identified, these could form a minor localised source of contamination if they are not managed correctly.

10.10.5. In terms of effects on groundwater, construction activities (including piling activities, earthworks, access tracks and excavation) could lead to minor damage to field drains, which may affect the localised drainage of the agricultural land and the groundwater quality of the underlying aquifer.

10.10.6. Spillages or leaks of fuels, oils and chemicals during construction works may lead to effects on groundwater, which could result in potential pollution to any underlying aquifers. Potential pollution may also arise from runoff associated with construction activities (e.g., silt run-off during earthworks and accidental spills and leaks from construction plant).

10.10.7. Effects on soil and agricultural land during the construction phase could include compaction and deterioration of soils and agricultural land. Access tracks and steep slopes within the Site are likely to be most susceptible to deterioration through erosion. Some soils are more susceptible to damage when handled during construction. Handling and moving of soil is expected to be avoided, where reasonably practicable. Some soils are, however, more susceptible to structural damage from the use of machinery and vehicular activity, depending upon soil type, climate and wetness class.

Operational (including maintenance) phase

10.10.8. With respect to land contamination, large numbers of vehicle movements are not anticipated within the Site during the operational (including maintenance) phase and therefore, although the potential exists for vehicles to cause contamination through fuel losses/leaks.

10.10.9. With respect to groundwater, maintenance works (including cleaning of the Solar PV modules and vehicle tracking) could result in spillages and leaks of fuels, oils and chemicals, which could lead to effects on groundwater resulting in potential pollution to any underlying aquifers.

10.10.10. The presence of piled foundations and increase in impermeable areas such as concrete hardstanding for the collector compounds, BESS and substations may locally affect the groundwater infiltration rates across the Site. It is anticipated that the BESS compound would incorporate a bund feature, which would prevent firewater from leaving the Site, should this be required. However, in the instance of a failure, there is a potential for

chemicals to infiltrate, which could result in potential pollution to the groundwater and any underlying aquifers.

10.10.11. With respect to soils and agricultural land, there is anticipated to be limited ground disturbance or trafficking over the soils, apart from periodic maintenance requirements, including replacement of damaged parts or cleaning and maintenance of the Solar PV modules, as described in **Chapter 3: Description of Rosefield Solar Farm**.

10.10.12. Rosefield Solar Farm would lead to temporary impacts to soil and agricultural land for the duration of the operational (including maintenance) phase (assumed to be 40 years), in particular the areas in which the BESS, Rosefield Substation, Main Collector Compound, Satellite Collector Compounds and operational access tracks would be located. The area of land underneath the Solar PV modules and within the field margins are expected to be used for ecological mitigation and enhancements, which would include planting (including establishment of grassland and wildflowers), which would help to reduce soil degradation and erosion during the operational (including maintenance) phase, which could lead to potential benefits.

10.10.13. It is anticipated that the operational (including maintenance) phase of Rosefield Solar Farm would lead to a temporary change of land use of agricultural land. Based on the ALC surveys undertaken to date, approximately 0.5% (3.0 ha) of this agricultural land is classified as Grade 2 BMV land and 1.2% (7.0 ha) is classified as Grade 3a BMV land. The area of BMV land within Site boundary is a small percentage of the wider BMV land area available in Buckinghamshire. These figures will be updated within the ES when the remaining 147 ha area has been surveyed. Given the soil types mapped on the land that has been surveyed, the Applicant anticipates the unsurveyed land to be entirely or almost entirely non-BMV land.

10.10.14. It is recognised that this does not account for other existing development and/or approved developments within Buckinghamshire that may lead to a reduction in available BMV land. For the purposes of this PEIR, a preliminary cumulative assessment which considers other existing development and/or approved developments that may impact BMV land is detailed in **Chapter 18: Cumulative Effects**. Consultation will be undertaken with Buckinghamshire Council to agree the list of other existing development and/or approved developments that need to be considered in the cumulative assessment. The detailed cumulative assessment will be presented within the ES.

Decommissioning phase

10.10.15. During decommissioning works, activities could result in effects on land contamination in the form of minor localised contamination of soils related to potential spills from plant.

10.10.16. With respect to soil, there is potential for erosion associated with works conducted on steep slopes located within the Site boundary. The number of vehicle movements is anticipated to be less than during the construction phase, limiting the potential for compaction of soils to occur. Decommissioning works are also less likely than construction works to adversely impact on agricultural field drains as there would be no requirement for piling, so this phase is less likely to result in deterioration of soil quality.

10.10.17. With respect to groundwater, decommissioning activities (including earthworks and excavation) could lead to minor damage to field drains, which may affect the localised drainage of the agricultural land and the groundwater quality of the underlying aquifer.

10.10.18. As a result of the decommissioning works, spillages and leaks of fuels, oils and chemicals may lead to effects on groundwater, which could result in potential pollution to any underlying aquifers. This may arise from runoff associated with activities (e.g., silt run-off during earthworks and accidental spills and leaks from machinery).

10.10.19. With respect to soils and agricultural land, the decommissioning phase would involve the dismantling and removal of infrastructure. Following decommissioning, it is intended that this land would be returned to the landowner.

10.10.20. All concrete, hardstanding areas, foundations for the infrastructure and any internal tracks would be removed to a depth of up to 1 m. It is assumed that all the below ground cables would be left in-situ as these are likely to be located at a depth greater than 1 m, therefore leaving them in the ground would limit the disturbance and impact to the soil quality.

10.10.21. The location of the BESS, Rosefield Substation, Main Collector Compound, Satellite Collector Compounds and access tracks will be restored using soil retained onsite, which could have been retained in managed bunds, or with new topsoil that would be brought to the Site. The trafficking of soils when conditions are unsuitable (e.g., when soils are wet) could damage soil structure, necessitating remedial activity to restore quality.

10.11. Additional mitigation

Construction phase

10.11.1. An Outline Construction Environmental Management Plan will be submitted in support of the DCO application. The Outline Construction Environmental Management Plan will set out measures to mitigate effects on land, soil and groundwater receptors, such as procedures to mitigate against erosion and contaminated land and include emergency procedures to manage accidental spillages and leaks.

10.11.2. An Outline Soil Management Plan will be submitted in support of the DCO application. The Outline Soil Management Plan will set out measures to manage any potential impacts to soil (and agricultural land) during and on completion of the construction phase.

10.11.3. The Outline Soil Management Plan will identify those areas within the Site which may be more susceptible to damage, for example, the temporary access tracks, Main Collector Compound, Satellite Collector Compounds and steep slopes; set out details of when soil handling should be avoided (for example when it is wet or after periods of heavy rainfall or high winds) and will advise on when soils are in a suitable condition for being handled or trafficked. The Outline Soil Management Plan will also set out measures for soil management and follow the principles of best practice to maintain the physical properties of the soil.

Operational (including maintenance) phase

10.11.4. An Outline Operational Environmental Management Plan will be submitted in support of the DCO application. Based on the findings of the Preliminary Risk Assessment, the Outline Operational Environmental Management Plan will describe measures to prevent damage to the land during the operational phase (including maintenance), together with measures for pollution prevention, and emergency procedures to manage accidental spillages and leaks. It will also outline procedures for managing the firewater, which may contain chemicals. In the event of a fire, any water used for fire suppression or prevention would be collected within a designated bund or suitable container, and then removed from site by tanker to prevent its release to the surrounding environment.

10.11.5. An Outline Battery Safety Management Plan will be submitted in support of the DCO application. The purpose of the Outline Battery Safety Management Plan will be to ensure the safe operation of the BESS and it will set out the parameters for the management of fire risk associated with the BESS.

10.11.6. An Outline Soil Management Plan will be submitted in support of the DCO application. For the operational (including maintenance) phase, the Outline Soil Management Plan will set out the following measures:

- Identification of those areas within the Site which may be more susceptible to damage, for example, steep slopes (which may not differ to those identified during the construction phase);
- Definition of standard parameters to identify when soil conditions are suitable for handling or trafficking (qualities of the soil, for example when it is wet or after periods of heavy rainfall or high winds); and
- Outline measures and principles for soil management and best practice to maintain the physical properties of the soil, with the aim of maintaining the condition of the land until the end of the lifetime of Rosefield Solar Farm.

10.11.7. An Outline Landscape and Ecological Management Plan will be submitted in support of the DCO application. The Outline Landscape and Ecological Management Plan will provide the principles of how the land within the Site would be managed during the operational phase (including maintenance), such as the requirements for the management and remediation of vegetation to ensure planting is sustained.

Decommissioning phase

10.11.8. An Outline Decommissioning Environmental Management Plan will be submitted in support of the DCO application. The Outline Decommissioning Environmental Management Plan will set out measures to mitigate likely effects relating to land contamination, soils, agricultural land or groundwater, such as best practice procedures to mitigate against erosion, measures to deal with contaminated land, and emergency procedures to manage accidental spillages and leaks.

10.11.9. An Outline Soil Management Plan will be submitted in support of the DCO application. For the decommissioning phase, the Outline Soil Management Plan will set out the following measures (some of which may differ from construction and operational (including maintenance) phases, depending on site conditions at the time of the works):

- Identification of those areas within the Site which may be more susceptible to damage, for example, steep slopes;
- Definition of standard parameters to identify when soil conditions are suitable for handling or trafficking (qualities of the soil, for example when it is wet or after periods of heavy rainfall or high winds); and
- Outline measures and principles for soil management and best practice to maintain the physical properties of the soil, with the aim of maintaining the condition of the land until the end of the lifetime of Rosefield Solar Farm.

10.12. Assessment of residual effects (with additional mitigation)

Construction phase

10.12.1. This preliminary assessment has not identified any significant sensitive receptors relating to land contamination based on the findings of the Preliminary Risk Assessment (see **Appendix 10.2** in **Volume 3**), and therefore receptors are considered to have **low** sensitivity. The magnitude of impact is considered to be **negligible** due to the application of the Construction Environmental Management Plan, and the significance of the effect is therefore **very low** and **not significant**.

10.12.2. With respect to groundwater, the aquifers are deemed to have a **medium** sensitivity. The magnitude of impact of construction activity on groundwater quality would be **negligible** due to the application of the

Construction Environmental Management Plan and therefore the significance of effect is considered to be **very low** and **not significant**.

10.12.3. With respect to soil quality, the land upon which Rosefield Solar Farm is proposed to be located is considered to have **high** sensitivity (ALC Grade 2 and 3a, BMV) or **medium** sensitivity (ALC Grade 3b, non-BMV). Due to mitigation that will prevent damage to the soil resource in terms of soil quality during construction, the magnitude of impact is considered to be **minor**. Therefore, the significance of effect is considered to be **slight or moderate adverse** and **potentially significant** for areas of Grade 3a soil (1.2% of the Site area surveyed to date) and **slight adverse** and **not significant** for areas of Grade 3b soil (97% of the Site area surveyed to date). This conclusion will be reviewed for the ES once the remaining 147 ha area has been surveyed. However, the Applicant anticipates the unsurveyed land to be entirely, or almost entirely, non-BMV land and therefore it is anticipated that the conclusions of this preliminary assessment would not change.

10.12.4. With respect to availability of agricultural land, the land upon which Rosefield Solar Farm is proposed to be located is considered to have **high** sensitivity (ALC Grade 2 and 3a, BMV) or **medium** sensitivity (ALC Grade 3b, non-BMV). Due to the temporary nature of the development, the magnitude of impact during construction is considered to be **minor**. Therefore, the significance of effect is considered to be **slight or moderate adverse** and **potentially significant** for areas of Grade 2 and 3a soil (1.7% of the Site area surveyed to date) and **slight adverse** and **not significant** for areas of Grade 3b soil (98.3% of the Site area surveyed to date). This conclusion will be reviewed for the ES once the remaining 147 ha area has been surveyed. However, the Applicant anticipates the unsurveyed land to be entirely, or almost entirely, non-BMV land and therefore it is anticipated that the conclusions of this preliminary assessment would not change.

Operational (including maintenance) phase

10.12.5. The Preliminary Risk Assessment has not identified any significant sensitive receptors relating to land contamination, and therefore this issue would be considered to be of **low** sensitivity. The magnitude of impact is considered to be **negligible** due to the application of the Operational Environmental Management Plan and the significance of the effect is therefore **very low** and **not significant**.

10.12.6. In terms of groundwater, the aquifers are deemed to have a **medium** sensitivity. The magnitude of impact on groundwater quality during the operational phase (including maintenance) would be **negligible** due to the application of the Operational Environmental Management Plan and therefore the significance of effect is considered to be **very low** and **not significant**.

10.12.7. With respect to soil quality, the land upon which Rosefield Solar Farm is proposed to be located is considered to have **high** sensitivity (ALC Grade 2 and 3a, BMV) or **medium** sensitivity (ALC Grade 3b, non-BMV). Overall, the magnitude of impact to soil resource quality during operation (including maintenance) is likely to be **negligible** as there would be no discernible loss or reduction or improvement of soil functions or soil volumes. Therefore, it is considered that the significance of effect would be either **slight adverse** or **neutral or slight adverse** and **not significant**. This conclusion will be reviewed for the ES once the remaining 147 ha area has been surveyed. However, the Applicant anticipates the unsurveyed land to be entirely, or almost entirely, non-BMV land and therefore it is anticipated that the conclusions of this preliminary assessment would not change.

10.12.8. With respect to availability of agricultural land, the land upon which Rosefield Solar Farm is proposed to be located is considered to have **high** sensitivity (ALC Grade 2 and 3a, BMV) or **medium** sensitivity (ALC Grade 3b, non-BMV). Due to the temporary nature of the development, the magnitude of impact during operation (including maintenance) is considered to be **minor**. Therefore, the significance of effect is considered to be **slight or moderate adverse** and **potentially significant** for areas of Grade 2 and 3a soil (1.7% of the Site area surveyed to date) and **slight adverse** and **not significant** for areas of Grade 3b soil (98.3% of the Site area surveyed to date). This conclusion will be reviewed for the ES once the remaining 147 ha area has been surveyed. However, the Applicant anticipates the unsurveyed land to be entirely, or almost entirely, non-BMV land and therefore it is anticipated that the conclusions of this preliminary assessment would not change.

Decommissioning phase

10.12.9. In relation to land contamination, there are not shown to be any significant sensitive receptors based on the findings of the Preliminary Risk Assessment, and therefore sensitivity is considered to be **low**. The magnitude of impact is considered to be **negligible** due to the application of the Decommissioning Environmental Management Plan and the significance of the effect is therefore **very low** and **not significant**.

10.12.10. The aquifers are classified as having **medium** sensitivity. The magnitude of impact on groundwater quality during the decommissioning phase would be **negligible** due to the application of the Decommissioning Environmental Management Plan and therefore the significance of effect is considered to be **very low** and **not significant**.

10.12.11. With respect to soil quality, the land upon which Rosefield Solar Farm is proposed to be located is considered to have **high** sensitivity (ALC Grade 2 and 3a, BMV) or **medium** sensitivity (ALC Grade 3b, non-BMV). Overall, the magnitude of impact to soil resource quality during the decommissioning phase is likely to be **negligible** as soils are expected to be managed to prevent damage to the soil resource, so far as possible

and would be returned to agricultural use. Therefore, it is considered that the significance of effect would be **slight adverse** or **neutral or slight adverse** and **not significant**. This conclusion will be reviewed for the ES once the remaining 147 ha area has been surveyed. However, the Applicant anticipates the unsurveyed land to be entirely, or almost entirely, non-BMV land and therefore it is anticipated that the conclusions of this preliminary assessment would not change.

10.12.12. With respect to availability of agricultural land, the land upon which Rosefield Solar Farm is proposed to be located is considered to have **high** sensitivity (ALC Grade 2 and 3a, BMV) or **medium** sensitivity (ALC Grade 3b, non-BMV). Overall, the magnitude of impact on agricultural land during decommissioning is likely to be **negligible** as soils are expected to be managed to prevent damage to the soil resource, so far as possible and would be returned to agricultural use. Therefore, it is considered that the significance of effect would be **slight adverse** or **neutral or slight adverse** and **not significant**. This conclusion will be reviewed for the ES once the remaining 147 ha area has been surveyed. However, the Applicant anticipates the unsurveyed land to be entirely, or almost entirely, non-BMV land and therefore it is anticipated that the conclusions of this preliminary assessment would not change.

10.13. Opportunities for enhancement

10.13.1. There is potential that soil health could be enhanced over the 40-year period of operation of Rosefield Solar Farm (facilitated through the implementation of a Soil Management Plan), due to the proposed planting of grassland and wildflowers, which would reduce the impact of soil erosion. This will be detailed and assessed further in the ES.

10.13.2. Furthermore, the soil quality will be enhanced during the period that it is not used for agriculture, as there will be no significant nutrient up-take by vegetation or repeat harvests, and there will be significant reduction in soil handling due to the lack of need for farming equipment to undertake harvesting operations.

10.14. Difficulties and uncertainties

10.14.1. The information provided in this PEIR is preliminary and is based on the data available at the time of writing. The final assessment of likely significant effects will be reported in the ES.

10.14.2. Potential data gaps include:

- On some occasions, historical information may not be available due to gaps between historical OS maps. However, for Rosefield Solar Farm, there are only minor changes to field boundaries between the subsequent map editions, and therefore it is considered unlikely that significant features have been missed;

- Due to the large area of the Site, the site walkover provided an overview of land parcels and cable route search areas, but there may be some features that were not observed;
- There are no previous ground investigations available for the Site (with the exception of the ALC survey); therefore, there is no specific information on concentrations of potential contaminants in soil and groundwater. However, this information will aim to be collected during site investigation work, the results of which will be submitted in support of the DCO application;
- Details of groundwater depth and flow direction are unknown. If necessary, relevant information could be obtained during site investigation work, the results of which will be submitted in support of the DCO application; and
- Potential uncertainties exist relating to climate change impacts, including predicted increases in extreme weather events and/or predicted long-term impacts, for example rising groundwater levels.

10.15. Further work required to inform the ES

10.15.1. To form a robust ES, the following work is proposed so that all aspects will be suitably considered:

- Assessment of geological units to demonstrate the absence of likely significant effects;
- ALC survey to be completed of the remaining fields (147 ha) within the Site boundary;
- Ground investigations of the Site. Potential contaminant linkages will aim to be assessed further through appropriate site investigation. This will be completed in support of the DCO application;
- Further consultation with statutory consultees, including Buckinghamshire Council and Natural England, will be undertaken in relation to the ALC survey results and the proposed Outline Soil Management Plan as part of the ongoing assessment that will inform the ES; and
- A Minerals Safeguarding Assessment will be undertaken to inform the on-going design of Rosefield Solar Farm and will form part of the Planning Statement submitted in support of the DCO application. Consultation will be undertaken with Buckinghamshire Council to discuss the Minerals Safeguarding Assessment and to understand any future ambitions for minerals extraction within the region.

11. Landscape and Visual

11.1. Introduction

11.1.1. This chapter presents a preliminary assessment of the likely significant effects arising from the construction, operation (including maintenance) and decommissioning of Rosefield Solar Farm on landscape and visual amenity and should be read in conjunction with the following figures in **Volume 2**, appendices in **Volume 3** and visualisations in **Volume 4**, respectively:

- **Figure 11.1 - Landscape Study Area, Context and Designations;**
- **Figure 11.2 - Topography and Land Cover;**
- **Figure 11.3 - National Character Areas;**
- **Figure 11.4 - District Landscape Character Types and Areas;**
- **Figure 11.5 - Visual Receptors within 1 km;**
- **Figure 11.6 - Proposed Viewpoints;**
- **Figure 11.7a - Solar Array ZTV for all Parcels Combined – Bare Earth;**
- **Figure 11.7b - Solar Array ZTV for Parcel 1 only – Bare Earth;**
- **Figure 11.7c - Solar Array ZTV for Parcel 2 only – Bare Earth;**
- **Figure 11.7d - Solar Array ZTV for Parcel 3 only – Bare Earth;**
- **Figure 11.8a - Solar Array ZTV for all Parcels Combined – Standard Screening;**
- **Figure 11.8b - Solar Array ZTV for Parcel 1 only – Standard Screening;**
- **Figure 11.8c - Solar Array ZTV for Parcel 2 only – Standard Screening;**
- **Figure 11.8d - Solar Array ZTV for Parcel 3 only – Standard Screening;**
- **Figure 11.9a - Solar Array ZTV for all Parcels Combined – Detailed Screening;**
- **Figure 11.9b - Solar Array ZTV for Parcel 1 only – Detailed Screening;**
- **Figure 11.9c - Solar Array ZTV for Parcel 2 only – Detailed Screening;**
- **Figure 11.9d - Solar Array ZTV for Parcel 3 only – Detailed Screening;**

- **Figure 11.10a - ZTV of Siting Zone for Structures up to 6m for Parcel 1 (Scenario 1) - Bare Earth;**
- **Figure 11.10b - ZTV of Siting Zone for Structures up to 6m for Parcel 1 (Scenario 1) - Standard Screening;**
- **Figure 11.11a - ZTV of Siting Zone for Structures up to 6m for Parcel 1 (Scenario 2) - Bare Earth;**
- **Figure 11.11b - ZTV of Siting Zone for Structures up to 6m for Parcel 1 (Scenario 2) - Standard Screening;**
- **Figure 11.12a - ZTV of Siting Zone for Structures up to 6m for Parcel 2 -Bare Earth;**
- **Figure 11.12b - ZTV of Siting Zone for Structures up to 6m for Parcel 2 -Standard Screening;**
- **Figure 11.13a - ZTV of Siting Zone for Structures up to 15m and 6m for Parcel 3 (Scenario 1) - Bare Earth;**
- **Figure 11.13b - ZTV of Siting Zone for Structures up to 15m and 6m for Parcel 3 (Scenario 1) - Standard Screening;**
- **Figure 11.14a - ZTV of Siting Zone for Structures up to 15m and 6m for Parcel 3 (Scenario 2) - Bare Earth;**
- **Figure 11.14b - ZTV of Siting Zone for Structures up to 15m and 6m - Parcel 3 (Scenario 2) - Standard Screening;**
- **Figure 11.15 Residential Property Location Plan;**
- **Appendix 11.1 - LVIA Methodology and Assessment Criteria;**
- **Appendix 11.2 - Extracts from Published Landscape Character Assessments;**
- **Appendix 11.3 - Landscape Sensitivity Analysis;**
- **Appendix 11.4 - Preliminary Viewpoint Analysis;**
- **Appendix 11.5 - Preliminary Residential Visual Amenity Assessment;** and
- **Visualisations for Viewpoints 1-37.**

11.1.2. This preliminary assessment considers the baseline and potential significant effects upon:

- Landscape fabric/elements i.e., the individual physical features of the Site, such as hedges and trees which can usually be quantified;
- Landscape character i.e., the distinct and recognisable pattern of elements in the landscape that makes one landscape different from another; and
- Visual receptors including residential, transport and recreational receptors.

11.1.3. This preliminary assessment has been prepared in accordance with the principles established in published best practice, namely the Guidelines for Landscape and Visual Impact Assessment (Third Edition) (GLVIA3)[1] and associated technical guidance notes including those published by the Landscape Institute (referenced as appropriate where introduced in this chapter). This preliminary assessment, however, is not intended to constitute a full Landscape and Visual Impact Assessment (LVIA), as insufficient detail is available to complete such an assessment at this stage. This preliminary assessment is based on the parameters established in **Chapter 3: Description of Rosefield Solar Farm**. A full LVIA will be presented in the ES based on the proposals comprising the DCO application.

11.1.4. Although linked, landscape and visual effects are considered separately. Landscape effects derive from changes in the landscape fabric, which may result in changes to landscape character, whereas visual effects are the effects of these changes as experienced by people (visual receptors).

11.1.5. In considering effects on landscape fabric, this preliminary assessment considers the removal or addition of elements such as vegetation in relation to landscape change, but the assessment of effects of Rosefield Solar Farm on ecological receptors is considered in **Chapter 7: Biodiversity**.

11.1.6. Likewise, this preliminary assessment considers cultural heritage assets in so much as they contribute to landscape character and its perceived value (for example, Conservation Areas are treated as areas where the character and views are valued). However, the assessment of effects of Rosefield Solar Farm on cultural heritage receptors is considered in **Chapter 9: Cultural Heritage**.

11.1.7. The potential effects of glint and glare arising from Rosefield Solar Farm are addressed separately in **Chapter 16: Glint and Glare**.

11.2. Stakeholder engagement

11.2.1. Consultation has taken place with Buckinghamshire Council on 4, 8 and 9 April 2024 and 20 and 22 May 2024 to discuss the proposed Zones of Theoretical Visibility (ZTV) and viewpoint selection for this preliminary assessment. A conference call was held on 29 May with Buckinghamshire Council to discuss aspects of the assessment, namely the rationale for viewpoint selection, the additional ZTVs that would be provided for Rosefield Substation, BESS and Collector Compounds and the type of visualisations that would be used to illustrate Rosefield Solar Farm; a response was received by email on 25 June 2024.

[1] Landscape Institute and Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment (Third Edition).

11.2.2. **Table 11.1** provides a summary of the engagement undertaken to date to inform this preliminary assessment.

Table 11.1 – Engagement undertaken to date

Stakeholder	Date and method	Key matters discussed
Buckinghamshire Council	04 April 2024 – Email	ZTV and viewpoints
Buckinghamshire Council	08 April 2024 – Email	ZTV and viewpoints
Buckinghamshire Council	09 April 2024 – Email	ZTV and viewpoints
Buckinghamshire Council	20 May 2024 – Email	ZTV and viewpoints
Buckinghamshire Council	22 May 2024 – Email	ZTV and viewpoints
Buckinghamshire Council	29 May 2024 – Conference call	ZTV and viewpoints, inclusion of additional ZTV for the Rosefield Substation, BESS and Collector Compounds and the use of photo wirelines to illustrate Rosefield Solar Farm for two scenarios within the PEIR. Buckinghamshire Council to review the updated ZTV and viewpoints issued 20 May 2024 to provide comment on their suitability in due course.
Buckinghamshire Council	25 June 2024 – Email	To consider HS2 and East West Rail including any elevated sections and related structures such as where East West Rail crosses over HS2, Addison Road crosses East West Rail and the overbridge that crosses HS2. Consider Sustrans cycle route No. 51 between Winslow and Bicester. Include views from within the Solar PV development and consider views for horse riders to bridleways. Include relevant views identified in policy: Areas of Attractive Landscape;

Stakeholder	Date and method	Key matters discussed
		Local Landscape Areas; and Neighbourhood plans. Consider screening effect of hedgerows through the life of Rosefield Solar Farm. Provide ZTVs for different height elements of Rosefield Solar Farm, noting that a final site design may require additional viewpoints.

11.3. Legislative framework, planning policy and guidance

11.3.1. The preliminary assessment has been undertaken with regard to the following legislation, planning policy and guidance.

Legislation

- Council of Europe Landscape Convention 2004[2];
- The Town and Country Planning (Tree Preservation) (England) Regulations 2012[3]; and
- The Hedgerows Regulations 1997[4].

National planning policy

- Overarching National Policy Statement for Energy (NPS EN-1) (2023)[5] – Sections 4.6 and 5.10 are of particular note for landscape and visual matters;

[2] European Landscape Convention. Available online:

[3] The Town and Country Planning (Tree Preservation) (England) Regulations 2012. Available online: https://www.legislation.gov.uk/uksi/2012/605/contents/made
[4] The Hedgerows Regulations 1997. Available online: https://www.legislation.gov.uk/uksi/1997/1160/contents/made
[5] Department for Energy Security and Net Zero (2023). Overarching National Policy Statement for Energy (EN-1). Available online: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1

- National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (2023)[6] – Sections 2.3, 2.5 and 2.10 are of particular note for landscape and visual matters;
- National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (2023)[7] which provides planning guidance for developers of nationally significant electricity network infrastructure – Sections 2.5, 2.9 and 2.10 are of particular note for landscape and visual matters; and
- National Planning Policy Framework (NPPF) (2023)[8] with reference to Sections 12 and 15, which are of particular note for landscape and visual matters.

Local planning policy

- Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021)[9], with relevant policies comprising:
  - Policy S1 'Sustainable development for Aylesbury Vale';
  - Policy S5 'Infrastructure';
  - Policy T7 'Footpaths and cycle routes';
  - Policy BE2 'Design of new development';
  - Policy BE3 'Protection of amenity of residents';
  - Policy NE1 'Biodiversity and Geodiversity';
  - Policy 'NE2 River and stream corridors';
  - Policy 'NE4 Landscape character and locally important landscape';
- Policy 'NE5 Pollution, air quality and contaminated land';
  - Policy 'NE8 Trees, hedgerows and woodlands';
  - Policy 'C3 Renewable Energy';

[6] Department for Energy Security and Net Zero (2023). National Policy Statement for Renewable Energy Infrastructure (EN-3). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3
[7] Department for Energy Security and Net Zero (2023). National Policy Statement for Electricity Networks Infrastructure (EN-5). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5
[8] Ministry of Housing, Communities and Local Government and Department for Levelling Up, Housing and Communities (2023). National Planning Policy Framework. Available online: https://www.gov.uk/government/publications/national-planning-policy-framework--2
[9] Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021). Available online: https://buckinghamshire-gov-uk.s3.amazonaws.com/documents/Aylesbury_local_plan_L46JWaT.pdf

  - Policy ‘C4 Protection of public rights of way’; and
  - Policy ‘I1 Green infrastructure'.

Neighbourhood development plans

- Buckinghamshire Council, Vale of Aylesbury Neighbourhood Plans[10]:
  - Steeple Claydon Neighbourhood Plan, September 2017;
  - Granborough Neighbourhood Plan, July 2022;
  - North Marston Neighbourhood Plan;
  - Winslow Neighbourhood Plan, March 2023; and
  - Quainton Neighbourhood Plan, June 2022.

Guidance

- Guidelines for Landscape and Visual Impact Assessment (Third Edition) (GLVIA3) (Landscape Institute and IEMA, 2013)[11];
- Technical Guidance Note 06/19: Visual Representation of Development Proposals (Landscape Institute, 2019)[12];
- Technical Guidance Note 02/21: Assessing landscape value outside national designations (Landscape Institute, 2021)[13];
- Technical Guidance Note 02/19: Residential Visual Amenity Assessment (Landscape Institute, 2019)[14];
- Technical Guidance Note 04/20: Infrastructure (Landscape Institute, 2020)[15];
- An Approach to Landscape Character Assessment (Natural England, 2014)[16];

[10] Buckinghamshire Council (2021). Vale of Aylesbury Neighbourhood Plans: https://www.buckinghamshire.gov.uk/planning-and-building-control/planning-policy/neighbourhood-planning/the-plans/
[11] Landscape Institute and Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment (Third Edition).
[12] Landscape Institute (2019). Landscape Institute Technical Guidance Note 06/19: Visual Representation of Development Proposals.
[13] Landscape Institute (2021). Landscape Institute Technical Guidance Note 02/21: Assessing landscape value outside national designations.
[14] Landscape Institute (2019). Landscape Institute Technical Guidance Note 02/19: Residential Visual Amenity Assessment.
[15] Landscape Institute (2020). Landscape Institute Technical Guidance Note 04/20: Infrastructure.
[16] Natural England (2014). An Approach to Landscape Character Assessment. Available online:

- An Approach to Landscape Sensitivity Assessment (Natural England, 2019)[17]
- Planning Practice Guidance for Natural Environment[18];
- Planning Practice Guidance for Renewable Energy and Low Carbon Energy[19];
- Planning Practice Guidance for Design: process and tools[20]; and
- Advice Note Seventeen: Cumulative Effects Assessment (Planning Inspectorate, 2019)[21].

11.4. Study area

11.4.1. GLVIA3[22] recommends that the Study area for consideration of landscape effects should *"include the site itself and the full extent of the wider landscape around it which the proposed development may influence in a significant manner."* It also recommends that a Landscape and Visual Impact Assessment should consider the area from which the Rosefield Solar Farm would potentially be visible but that the emphasis *"must be on a reasonable approach which is proportional to the scale and nature of the proposed development."*

11.4.2. The Study area for this preliminary assessment extends up to 6 km from the Site boundary as agreed with the requirements of Buckinghamshire Council.

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https://assets.publishing.service.gov.uk/media/5aabd31340f0b64ab4b7576e/landscape-character-assessment.pdf

[17] Natural England (2019). An Approach to Landscape Sensitivity Assessment. Available online: https://assets.publishing.service.gov.uk/media/5d2f005aed915d2fe684675b/landscape-sensitivity-assessment-2019.pdf

[18] Planning Practice Guidance for Natural Environment (2024). Available online: https://www.gov.uk/guidance/natural-environment

[19] Planning Practice Guidance for Renewable Energy and Low Carbon Energy (2023). Available online: https://www.gov.uk/guidance/renewable-and-low-carbon-energy

[20] Planning Practice Guidance for Design: process and tools (2019). Available online: https://www.gov.uk/guidance/design

[21] Planning Inspectorate (2019). Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects (Version 2). Available online: https://www.gov.uk/government/publications/nationally-significant-infrastructure-projects-advice-note-seventeen-cumulative-effects-assessment-relevant-to-nationally-significant-infrastructur

[22] Landscape Institute and Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment (Third Edition).

11.4.3. This Study area is considered proportionate and adequate to identify all non-negligible effects on landscape and visual receptors and is adequate to identify all likely significant effects as the ZTVs illustrate worst-case scenarios. The purpose of the preliminary ZTVs presented in **Figures 11.7** to **11.14** in **Volume 2** is to identify the maximum possible theoretical extents of visibility of Rosefield Solar Farm and to help identify potential visual receptors. In each case, the ZTVs take account of the worst-case scenario of a 'bare earth' landform with no screening elements and a 'standard screening' ZTV which takes into account significant blocks of woodland and buildings. As is typical for all such ZTVs, the visibility shown on the plans is exaggerated and the actual extent of visibility of Rosefield Solar Farm would be more constrained than indicated. In order to provide a more detailed review of visibility, ZTVs, presented in **Figures 11.9a** to **11.9d** in **Volume 2**, have been prepared that illustrate the screening effect of additional vegetation using Environment Agency's Vegetation Object Model dataset[23] for the Solar PV array only.

11.4.4. Extensive site work has been undertaken to confirm that no part of Rosefield Solar Farm would be prominent in views or cause a significant effect on visual amenity beyond the Study area proposed.

11.4.5. The Study area is presented in **Figure 11.1** in **Volume 2**.

11.5. Establishing baseline conditions

11.5.1. Initially, a desk-based study of the landscape was undertaken. The following sources of information have been reviewed to inform the baseline assessment presented in **Section 11.6**:

- OS maps at various scales;
- Online aerial photography;
- The Magic Map application available online from the Defra website[24];
- National Character Area (NCA) Profile 108: Upper Thames Clay Vale[25];
- National Character Area (NCA) Profile 109: *Midvale Ridge*[26];

[23] Environment Agency Vegetation Object Model dataset: https://www.data.gov.uk/dataset/227ab487-e8f2-4cbb-b26a-9e6d3b662265/lidar-vegetation-object-model-vom
[24] Available online: https://magic.defra.gov.uk/magicmap.aspx
[25] Natural England (2015). National Character Area (NCA) Profile 108: Upper Thames Clay Vale. Available online: https://publications.naturalengland.org.uk/publication/5865554770395136
[26] Natural England (2015). National Character Area (NCA) Profile 109: Midvale Ridge. Available online: https://publications.naturalengland.org.uk/publication/5431100

- Aylesbury Vale Landscape Character Assessment, 2008, Land Use Consultants[27];
- Steeple Claydon Neighbourhood Plan, September 2017[28];
- Granborough Neighbourhood Plan, July 2023[29];
- Winslow Neighbourhood Plan, March 2023[30];
- Quainton Neighbourhood Plan, June 2022[31];
- North Marston Neighbourhood Plan[32]; and
- Defining the Special Qualities of local landscape designations in Aylesbury Vale District, 2016, Land Use Consultants[33].

11.5.2. Information from the above sources has been used to map and present the baseline landscape conditions and potential visibility of Rosefield Solar Farm (see **Figures 11.1** to **11.7** in **Volume 2**).

11.5.3. In order to check the information obtained from the desk-based study was accurate (ground-truthing), field work has been undertaken between January 2023 and March 2024. This has included numerous visits to the Site and surrounding areas.

11.5.4. Public rights of way have been walked and all the local settlements have been visited within the Study area to ascertain potential views of Rosefield Solar Farm.

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[27] The Aylesbury Vale Landscape Character Assessment, 2008. Land Use Consultants https://www.buckinghamshire.gov.uk/planning-and-building-control/planning-policy/landscape-policy-and-assessments/landscape-character-assessments/

[28] Steeple Claydon Neighbourhood Plan, September 2013: [redacted]

[29] Granborough Neighbourhood Plan, July [redacted]

[30] Winslow Neighbourhood Plan, March 2023: [redacted]

[31] Quainton Neighbourhood Plan, June 2022: [redacted]

[32] North Marston Neighbourhood Plan: [redacted]

[33] Defining the Special Qualities of local landscape designations in Aylesbury Vale District, 2016. Land Use Consultants, available by request from planningpolicyteam.bc@buckinghamshire.gov.uk

11.5.5. Residential properties have been observed from publicly accessible locations (i.e. roads and footpaths). A more detailed Residential Visual Amenity Assessment will be undertaken in the ES. Preliminary information relating to residential visual amenity is presented in **Appendix 11.5** in **Volume 3** and this appendix also identifies properties for further detailed assessment.

11.5.6. Viewpoint photography, presented in **Volume 4**, was captured on multiple dates in March and April 2024. It is noted that weather during January to April 2024 was particularly inclement for a sustained period and it is recognised that some photography will need to be retaken prior to submission of the ES.

11.6. Environmental baseline

11.6.1. **Figure 11.1** in **Volume 2** illustrates the wider landscape context for Rosefield Solar Farm, including local settlements and landscape designations, whilst **Figure 11.5** in **Volume 2** illustrates main transport routes and public access within the a 1 km buffer. **Figure 11.1** in **Volume 2** illustrates the local land cover, which is predominantly arable farmland with smaller areas of woodland blocks; areas of woodland and surface water are also illustrated in **Figure 11.2** in **Volume 2** along with surface water features.

11.6.2. As illustrated by **Figure 11.2** in **Volume 2**, the local landscape is characterised by low lying vales and clay plateaus punctuated by low hills and ridgelines, ranging between *circa* 65 metre above ordnance datum (m AOD) and 190 m AOD. The landscape has no major rivers and is drained by a series of streams and ditches with other surface water features limited to field ponds and lakes as a result of clay extraction.

11.6.3. The landscape is dominated by farmland consisting of arable and grazing land with generally intact and strong hedgerows with some hedgerow trees. Although woodland cover is generally low across Aylesbury, the Study area benefits from good local cover, particularly to within and south of Parcels 1 and 2. With the exception of Winslow, the settlement pattern is distinctly rural and dispersed, resulting in a largely tranquil countryside. There are no specifically identified vistas (as referenced in the Local Development Plan or published landscape character assessments), focal points or prominent horizons. However, the North Marston Neighbourhood Plan[34] identifies '*Key Views*' in the direction of Rosefield Solar Farm (Parcel 2), whilst the Steeple Claydon Neighbourhood Plan[35] notes (at

[34] North Marston Neighbourhood Plan. [redacted]

[35] Steeple Claydon Neighbourhood Plan, September (2013). [redacted]

Policy SC8: Design) that views into open countryside, which would potentially include views of Rosefield Solar Farm within Parcel 1, to the south of Queen Catherine Road, should be respected. Further to this, long distance views, including those of the Site, are characteristic of the Landscape Character Type (LCT) 9 Low Hills and Ridges, represented by Landscape Character Area (LCA) 9.2 Quainton Hill and LCA 9.3 Pitchcott-Whitchurch Ridge, within the Study area. The energy from waste facility at Calvert is currently a prominent vertical feature in the wider landscape in such views.

Landscape designations

11.6.4. No part of the Site or its immediately surrounding context falls within a statutory designated landscape.

11.6.5. The nearest nationally designated landscape is the Chilterns National Landscape, which is approximately 18 km from the Site and not within the Study area.

11.6.6. The document 'Defining the Special Qualities of Local Landscape Designations in Aylesbury Vale District'[36], has been prepared to inform the Council's landscape evidence base and Local Plan by defining the landscape's special character and qualities. The document identifies six Areas of Attractive Landscape and a further six Local Landscape Areas. The document states that most of the Areas of Attractive Landscape "…*have stronger special qualities and are relatively higher in landscape value in comparison to the Local Landscape Areas (LLAs), which are generally smaller scale locally valued features*." The relevant local landscape designations within the Study area are presented in **Figure 11.1** in **Volume 2**.

11.6.7. The southern area of Parcel 2 lies within the locally designated Quainton-Wing Hills Area of Attractive Landscape[37]. This Area of Attractive Landscape is defined as "*A large area of undulating hills and ridges spanning east – west and populated with a series of small villages*". **Figure 11.1** in **Volume 2** illustrates the extent of the Area of Attractive Landscape which broadly corresponds to LCT 9: Low Hills and Ridges and more specifically LCA 9.1: Finemere Hill and 9.2: Quainton Hill. The

[redacted]

[36] Defining the Special Qualities of local landscape designations in Aylesbury Vale District, (2016). Land Use Consultants, available by request from planningpolicyteam.bc@buckinghamshire.gov.uk

[37] Defining the Special Qualities of local landscape designations in Aylesbury Vale District, (2016). Land Use Consultants, available by request from planningpolicyteam.bc@buckinghamshire.gov.uk

specific characteristics and special qualities of this Area of Attractive Landscape are identified and reproduced in **Appendix 11.2** in **Volume 3**.

11.6.8. Claydon Registered Park and Garden[38] is illustrated in **Figure 11.1** in **Volume 2** and is located in LCA 7.3: Claydon Bowl. Registered Parks and Gardens are heritage rather landscape designations but are included as indicators of heritage value in the landscape as described in **Appendix 11.3** in **Volume 3**. Effects on cultural heritage and setting are considered in **Chapter 9: Cultural Heritage**.

11.6.9. Waddesdon Manor Registered Park and Garden and Wotton Underwood Registered Park and Garden are both located over 4.5 km from the nearest Solar PV modules as illustrated in **Figure 11.1** in **Volume 2**. As illustrated by **Figures 11.9a** to **9c** in **Volume 2**, the level of potential visibility of Rosefield Solar Farm is low for these two Registered Parks and Gardens. Field survey work, in conjunction with the visualisations presented in **Volume 4**, and preliminary viewpoint analysis in **Appendix 11.4** in **Volume 3**, demonstrates that any distant glimpses of Rosefield Solar Farm would be barely perceptible and therefore these Registered Parks and Gardens are not considered further within this preliminary assessment.

Landscape character

11.6.10. Published landscape character documents that are relevant to the Study area have been reviewed and these documents have helped to shape an understanding of the existing baseline:

- National Character Area (NCA) Profile 108: Upper Thames Clay Vale, 2015, Natural England[39];
- National Character Area (NCA) Profile 109: Midvale Ridge, 2015, Natural England[40];
- National Character Area (NCA) Profile 88: Bedfordshire and Cambridgeshire Claylands, 2014, Natural England[41];

[38] Claydon Registered Park and Garden, available online:
[redacted]

[39] Natural England (2015). National Character Area (NCA) Profile 108: Upper Thames Clay Vale. Available online:
[redacted]

[40] Natural England (2015). National Character Area (NCA) Profile 109: Midvale Ridge. Available online:
[redacted]

[41] Natural England (2014). National Character Area (NCA) Profile 88: Bedfordshire and Cambridgeshire Claylands, available online:
[redacted]

- Aylesbury Vale Landscape Character Assessment, 2008, Land Use Consultants[42]; and
- Defining the special qualities of local landscape designations in Aylesbury Vale District, 2016, Land Use Consultants[43].

11.6.11. The landscape character of England was assessed and classified as part of the Character of England project published by the then Countryside Agency in 1999 and updated between 2011 and 2015 by Natural England. The studies identified a number of NCAs. Nationally, Rosefield Solar Farm lies primarily within NCA 108: Upper Thames Clay Vale with only the southern extents of the road access extending to an approximate 1.4 km section to the north western edge of NCA 109: Midvale Ridge, as presented in **Figure 11.3** in **Volume 2**.

11.6.12. The northern and north eastern extents of the Study area lie within NCA 88: Bedfordshire and Cambridgeshire Claylands. The ZTVs (**Figures 11.7** to **11.14** in **Volume 2**) demonstrate some intervisibility with NCA 88; however, any limited views would predominantly be at distances of over 5 km from Rosefield Solar Farm and would have a negligible effect on NCA 88 as a whole, hence NCA 88 has not been considered further within this preliminary assessment.

11.6.13. At a district level, the Aylesbury Vale Landscape Character Assessment identifies LCTs and LCAs. Within Aylesbury Vale, a total of 13 LCTs have been identified, which are further subdivided into 79 LCAs. The LCAs within the Study area are presented in **Figure 11.4** in **Volume 2**.

11.6.14. The assessment of landscape effects in this preliminary assessment has used the published character studies as the starting point for identifying the landscape baseline and the basis of the assessment of effects on landscape character. Whilst the NCAs provide a useful starting point to understand Rosefield Solar Farm within its wider Study area context, the district level LCAs provide the most detailed and appropriate assessment in order to assess the potential changes to landscape character of the Study area as a result of Rosefield Solar Farm.

11.6.15. Approximately half of the Site is located within LCT 7: Wooded Rolling Lowlands and specifically LCA 7.3: Claydon Bowl. This includes the whole of Parcel 1 and the north-western section of Parcel 2. The southern section of Parcel 2 is located in LCT 9: Low Hills and Ridges and

[42] The Aylesbury Vale Landscape Character Assessment, (2008). Land Use Consultants https://www.buckinghamshire.gov.uk/planning-and-building-control/planning-policy/landscape-policy-and-assessments/landscape-character-assessments/

[43] Defining the Special Qualities of local landscape designations in Aylesbury Vale District, (2016). Land Use Consultants, available by request from planningpolicyteam.bc@buckinghamshire.gov.uk

specifically LCA 9.1: Finemere Hill. Parcel 3 is located in LCT 5: Shallow Valleys, with the majority located in LCA 5.7: Hogshaw Claylands and just the northernmost extents located in LCA 5.6: Claydon Valley.

11.6.16. From west to east, the cable route options pass through LCA 7.3: Claydon Bowl; LCA 9.1: Finemere Hill; LCA 5.7: Hogshaw Claylands; and LCA 5.6 Claydon Valley. Small sections of the cable route will pass overground; however, because of their very localised and low lying nature, it is highly unlikely that underground or overground cables would have any significant effect on these LCAs during either the construction, operational (including maintenance) or decommissioning phases of Rosefield Solar Farm and as such their effects on these LCAs are not considered further within this preliminary assessment.

11.6.17. The proposed road access passes through LCA 7.4 Kingswood Wooded Farmland and LCA 5.9 Westcott Claylands to the south, as illustrated by **Figure 11.4** in **Volume 2**. Due to the short term duration of the construction works and their limited extents and visibility, it is highly unlikely that road works would have any significant effect on these LCAs during either the construction, operational (including maintenance) or decommissioning phases of Rosefield Solar Farm and as such their effects on these LCAs are not considered further within this preliminary assessment.

11.6.18. In addition to these 'host' LCA, LCA 5.4 Twyford Vale, LCA 5.8 North Marston Undulating Farmland, LCA 9.2: Quainton Hill and LCA 9.3 Pitchcott-Whitchurch Ridge have also been included as indirectly affected landscapes potentially experiencing effects approaching the threshold of a likely significant effect during either the construction, operational (including maintenance) or decommissioning phases of Rosefield Solar Farm.

11.6.19. Relevant extracts relating to these NCAs, LCTs and LCAs are provided in **Appendix 11.2** in **Volume 3**. An assessment of the landscape sensitivity is provided in **Appendix 11.3** in **Volume 3**.

11.6.20. Field survey work, in conjunction with the visualisations presented in **Volume 4,** and preliminary viewpoint analysis in **Appendix 11.4** in **Volume 3**, demonstrates that any distant glimpses of Rosefield Solar Farm beyond LCAs 5.4, 5.7, 5.8, 7.3, 9.1, 9.2 and 9.3 would be barely perceptible and would not come close to approaching the threshold of a likely significant effect during either the construction, operational (including maintenance) or decommissioning phases of Rosefield Solar Farm. The other LCAs within the Study area would not have either their character or landscape elements directly impacted by Rosefield Solar Farm and do not have an identified key characteristic that includes views of the Site and have therefore not been considered further in this preliminary assessment.

11.6.21. **Table 11.2** below presents those landscape receptors that are not considered further within this preliminary assessment.

Table 11.2 – Landscape receptors not considered further within this preliminary assessment

Receptor	Justification
Aylesbury Vale Landscape Character Areas	
LCT 4 Undulating Clay Plateau: LCA 4.2- 4.3, LCA 4.6, LCA 4.8, LCA 4.10-13,	The ZTVs indicate some distant visibility from these LCAs, particularly LCA 4.2 and 4.12. However, field work has established that there would be no, or very limited, intervisibility between the Site and any of the LCAs and none are likely to result in effects which would reach the threshold of a significant effect.
LCT 5 Shallow Valleys: LCA 5.1, LCA 5.5, LCA 5.9	The ZTVs indicate some visibility from these LCAs, particularly LCA 5.9. However, field work has established that there would be no, or very limited, intervisibility between the Site and any of the LCAs and none are likely to result in effects which would reach the threshold of a significant effect.
LCT 7 Wooded Rolling Lowlands: LCA 7.1-7.2, LCA 7.4, LCA 7.5	The ZTVs indicate some visibility from these LCAs, including LCAs 7.2 and 7.4 which adjoin the Site boundary to its southern and western extents. However, field work has established that there would be no, or very limited, intervisibility between the Site and any of the LCAs and none are likely to result in effects which would reach the threshold of a significant effect.
LCT 8 Vale: LCA 8.1-8.2, LCA 8.5	The ZTVs indicate some visibility from these LCAs, particularly LCA 8.1, which was requested to be included shows a large degree of potential intervisibility. However, field work has established that there would be no, or very limited, actual intervisibility between the Site and any of the LCAs and none are likely to result in effects which would reach the threshold of a significant effect.
LCT 9 Low Hills and Ridges: LCA 9.4	The ZTVs indicate some distant visibility from this LCA. However, field work has established that there would be no, or very limited, intervisibility between the Site and the LCA and none likely to result in effects which would reach the threshold of a significant effect.
Oxfordshire Landscape Character Areas	
Upper Thames Vale: LCA 1 Alluvial Lowland, LCA 3 Clay Vale	The ZTVs indicate some distant visibility from these LCAs. However, field work has established that there would be no, or very limited, intervisibility between the Site and any of the LCAs and none are likely to result in effects which would reach the threshold of a significant effect.

Receptor	Justification
Northamptonshire Vales: LCA 10 River Meadowlands, LCA 12 Rolling Farmland	The ZTVs indicate some distant visibility from these LCAs. However, field work has established that there would be no, or very limited, intervisibility between the Site and any of the LCAs and none are likely to result in effects which would reach the threshold of a significant effect.

Visual receptors

11.6.22. Visual receptors are defined by GLVIA3 as "*the different groups of people who may experience views of the development*". In order to identify those groups who may be significantly affected by Rosefield Solar Farm, an initial review of the ZTVs, baseline studies and preliminary site visits have been undertaken.

11.6.23. The visual receptors likely to be affected by Rosefield Solar Farm comprise:

- Residents (within settlements and at isolated farmsteads/dwellings);
- Users of public rights of way;
- Users of the local road network;
- Railway users; and
- Visitors to tourist attractions/heritage assets.

11.6.24. The locations of the primary visual receptors within the Study area are presented in **Figure 11.5** in **Volume 2**.

11.6.25. The undulating nature of the landscape, together with substantial areas of woodland means that views can, in part, be locally contained to shorter distances whilst elsewhere there can be longer distance views around the Study area.

Settlements

11.6.26. The settlements within the Study area are detailed in **Table 11.3**, with brief comments on location and potential visibility of Rosefield Solar Farm. All the settlements are considered in **Section 11.12** within this preliminary assessment, unless stated otherwise in **Table 11.3**.

Table 11.3 – Settlements within the Study area

Settlement	Location	Comments
Addington	2.8 km north of Field E10	Located within the north of the Study area and within the ZTV for Parcel 3, but outside all the other ZTVs. Field study has established that there would be no, or very limited, intervisibility

Settlement	Location	Comments
		between the Site and Parcel 3 and none likely to result in effects which would reach the threshold of a likely significant effect.
Adstock	4.5 km north of Field E10	Located within the north of the Study area and outside all ZTVs. It demonstrates no intervisibility with Rosefield Solar Farm and is not considered further within this preliminary assessment.
Botolph Claydon	North of Field D2	Located in the landscape to the north of Parcel 2 and 0.9 km west of Parcel 3.
Calvert	0.3 km west of Field B7	Located within the west of the Study area and outside all ZTVs. It demonstrates no intervisibility with Rosefield Solar Farm and is not considered further within this preliminary assessment.
Charndon	2 km west of Field B1	Located within the west of the Study area and outside all ZTVs. It demonstrates no intervisibility with Rosefield Solar Farm and is not considered further within this preliminary assessment.
East Claydon	0.9 km west of Field E22	Located within the north of the Study area, 0.9 km west of Parcel 3 and 2.7 km north-east of Parcel 2.
Edgcott	2.4 km west of Field B7	Located within the west of the Study area and outside all ZTVs. It demonstrates no intervisibility with Rosefield Solar Farm and is not considered further within this preliminary assessment.
Granborough	0.9 km east of Field E11	Located within the east of the Study area, 0.9 km east of Parcel 3 and 1 km north of Parcel 2.
Grendon Underwood	3.4 km south of Field B7	Located within the south of the Study area, 3.4 km south of Parcel 1 and 3.9 km south-west of Parcel 2.
Hillesden	3.6 km north of Field B5	Located to the north of the Study area and outside of the ZTVs. It demonstrates no intervisibility with Rosefield Solar Farm and is not considered further within this preliminary assessment.

Settlement	Location	Comments
Hillesden Hamlet	5.2 km north of Field B5	Located within the north of the Study area, 5.2 km north of Parcel 1.
Hoggeston	5 km east of Field E10	Located within the east of the Study area and outside all ZTVs. It demonstrates no intervisibility with Rosefield Solar Farm and is not considered further within this preliminary assessment.
Horwood	5 km north of Field E10	Located within the north of the Study area, 5 km north of Parcel 3.
Little Horwood	5.8 km north-east of Field E10	Located within the east of the Study area and outside all ZTVs. It demonstrates no intervisibility with Rosefield Solar Farm and is not considered further within this preliminary assessment.
Marsh Gibbon	4.2 km west of Field B7	Located to the west of the Study area and outside of the ZTVs. It demonstrates no intervisibility with Rosefield Solar Farm and is not considered further within this preliminary assessment.
Middle Claydon	1.1 km north-east of Field B23 north	Located to the north of the Study area and 1.1 km north-east of Parcel 1 and 1.5 km north-west of Parcel 2.
North Marston	2.5 km south-east of Field E23	Located to the east of the Study area and 2.5 km south-east of Parcel 3 and 3 km east of Parcel 2.
Oving	4.5 km south-east of Field E23	Located to the east of the Study area and 4.5 km south-east of Parcel 3 and 4.8 km east of Parcel 2.
Padbury	5.2 km north of Field B23 north	Located to the north of the Study area 5.2 km north of Parcel 1, 5.9 km north of Parcel 2 and 3.
Poundon	4.4 km west of Field B1	Located to the west of the Study area 4.4 km west of Parcel 1.
Preston Bisset	5.7 km north-west of Field B1	Located to the north of the Study area and 5.7 km north-west of Parcel 1.

Settlement	Location	Comments
Quainton	2.3 km south-east of Field D28	Located to the south-east of the Study area and outside of the ZTVs. It demonstrates no intervisibility with Rosefield Solar Farm and is not considered further within this preliminary assessment.
Shipton Lee	0.8 km south-east of Field D31	Located to the south-east of the Study area and nominally within the ZTV for Parcel 2. Field study has established that there would be no, or very limited, intervisibility between the Site and Parcel 3 and none likely to result in effects which would reach the threshold of a likely significant effect.
Steeple Claydon	1.6 km north of Field B5	Located within the north of the Study area and within the ZTV for Parcel 1, but outside all the other ZTVs.
Swanbourne	4.4 km east of Field E10	Located to the east of the Study area 4.4 km east of Parcel 3.
Twyford	2.6 km west of Field B1	Located to the west of the Study area and outside of the ZTVs. It demonstrates no intervisibility with Rosefield Solar Farm and is not considered further within this preliminary assessment.
Westcott	5.2 km south of Field D28	Located to the south of the Study area 5.2 km south of Parcel 2.
Waddesdon	5.4 km south of Field D28	Located to the south of the Study area 5.4 km south of Parcel 2.
Whitchurch	5.4 km south-east of Field E23	Located to the south-east of the Study area and outside of the ZTVs. It demonstrates no intervisibility with Rosefield Solar Farm and is not considered further within this preliminary assessment.
Winslow	1.7 km north-east of Field E10	Located to the north-east of the Study area and 1.7 km north-east of Parcel 3 and 4 km north-east of Parcel 2.

11.6.27. For the majority of the above settlements, there would be limited views into Rosefield Solar Farm due to the intervening local topography, vegetation and low-level nature of Rosefield Solar Farm with views of Rosefield Solar Farm, primarily from the fringes of these settlements.

Proposed mitigation will be designed to reduce the potential for views depending on the final design scenario.

11.6.28. In addition to the settlements listed in **Table 11.3**, there are scattered properties throughout the Study area, including some in relatively close proximity to Rosefield Solar Farm. Residential properties located within or just beyond 200 m from the Solar PV modules are listed below in **Table 11.4**. Properties that lie outside of 200 m from the Solar PV modules but are located within 400 m of structures up to 6 m and within 800 m of structures up to 15 m (the siting zone for Rosefield Substation) are also noted in **Table 11.4** below. The location of these properties is identified in **Figure 11.15** in **Volume 2**. **Appendix 11.5** in **Volume 3** which also sets out preliminary information relating to these properties and explains how potential effects on residential visual amenity will be assessed in the ES.

Table 11.4 – Properties shown on the Figure 11.15 in Volume 2

Property	Closest field
Calvert Cottages	B5
Great Pond Farm	B5
The Old Dairy	B5
The Old Granary	B5
Catherine Cottages	B23 north
Blackmorehill Cottages	B23 north
Knowlhill Farm	B18
Bernwood Farm	D4
Weir Cottage	D4
Borshaw Farm	D19
The Annex, Hogshaw Farm	D19
Hogshaw Farm Bungalow	D19
Wagtail Cottage	D19
The Barn House	D19
Piglets Place	D19
Touchwood, Weir Lane	D44
33 Weir Lane	D44

Property	Closest field
Corner House, Weir Lane	D44
Berry Leys	E10
Tuckey Cottage	E10
Station House	E11
Sion Hill Farm	E22

Main roads

11.6.29. Main roads (linear transport routes) within the Study area are identified in **Figure 11.5** in **Volume 2**. Whilst the ZTV indicates that 'theoretical' visibility extends up to a number of more peripheral roads, including the A41 and A413, extensive site work has established that any visibility to Rosefield Solar Farm would be restricted to the following roads:

- Queen Catherine Road, east to west to the east of Steeple Claydon and north of Parcel 1;
- Orchard Way/Calvert Road, east to west to the northern boundary of Parcel 1 and Parcel 2;
- Claydon Road, north to south to the eastern boundary of Parcel 2; and
- East Claydon Road, east to west, to the north of Parcel 3.

11.6.30. The effects on all other main roads (excluding local side roads/country lanes) would be negligible and therefore they are not considered further within this preliminary assessment.

Main transport routes

11.6.31. Main linear transport routes within the Study area are identified in **Figure 11.5** in **Volume 2**. Whilst the ZTV indicates that 'theoretical' visibility extends for HS2/East West Rail, extensive site work has established that any visibility would be greatly limited from HS2, which is primarily in cutting to the south of Rosefield Solar Farm and would therefore be screened from Rosefield Solar Farm by intervening topography and generally mature woodland and hedgerow vegetation. Some potential visibility remains for East West Rail which runs east to west in an elevated position to the north of Rosefield Solar Farm.

Recreational routes

11.6.32. Recreational routes[44] within the Study area are shown in **Figure 11.5** in **Volume 2**.

11.6.33. There are no national trails within the Study area. The nearest is the Ridgeway passing approximately 20 km south-east of Parcel 2 at its closest. The trail falls outside the Study area and ZTV for Rosefield Solar Farm and is therefore not considered further within this preliminary assessment.

11.6.34. The Bernwood Jubilee Way and North Buckinghamshire Way are popular promoted routes which run within the Site and wider Study area. The Bernwood Jubilee Way starts at Ludgershall and Waddesdon in the south, then extends to Preston Bisset and Steeple Claydon in the north, running within and around much of the length of Parcel 2 to the south of Botolph Claydon. The North Buckinghamshire Way runs north to south through the Study area, to the east of the Bernwood Jubilee Way, albeit briefly overlapping at East Claydon. Matthew's Way is a third promoted route that lies entirely beyond the Site, but within the Study area. It follows the North Buckinghamshire Way across Simber Hill/Quainton Hill and returns in a loop to Quainton via North Marston. It has not been considered separately as views are only possible from this route where it overlaps the North Buckinghamshire Way.

11.6.35. The Midshires Way long distance path also runs north to south through the Study area, to the east of the Bernwood Jubilee Way, which it briefly overlaps at East Claydon. The Swan's Way and Outer Aylesbury Ring long distance paths extend from Waddesdon in the south, via Quainton, overlapping on Quainton Hill to the south of Rosefield Solar Farm. The Cross Bucks Way long distance path runs east to west from Swanbourne to Stratton Audley, approximately 2 km from Rosefield Solar Farm at its closest point at Winslow. However, it falls largely outside of the ZTV and has very limited potential visibility of Rosefield Solar Farm and is therefore not considered further within this preliminary assessment.

11.6.36. National Cycle Network[45] (NCN) Route No. 51 uses the local road network between Bicester and Milton Keynes via Winslow to the north of Rosefield Solar Farm. It is located in the Study area passing within 1 km of Parcel 1 at its closest point and at least partially falls within the ZTV.

11.6.37. NCN Route No. 50 extends to the north of Route No. 51 but falls predominantly outside the ZTV for Rosefield Solar Farm, with no views of

[44] Recreational routes identified via the Long Distance Walkers Association website: [redacted]

[45] The National Cycle network: [redacted]

Rosefield Solar Farm, and is therefore not considered further within this preliminary assessment.

11.6.38. The public rights of way[46] within the Study area are identified by name in **Figure 11.5** in **Volume 2**. Whilst all public rights of way within the Study area will be considered in the ES, those closest to Rosefield Solar Farm, and most likely to be impacted, are as follows:

- Public rights of way (SCL/7/1, SCL/7/2, SCL/8/1, SCL/8/2, SCL/8/3, SCL/8/4, SCL/9/1, SCL/9/3, SCL/7/1) and Addison Road extend north to south from Steeple Claydon towards the northern boundary of Parcel 1 and Calvert Road;
- Public rights of way (MCL/10/1 & MCL/10/2) extend between Calvert Road and Queen Catherine Road to the north of Parcel 1;
- Public rights of way (SCL/12/1, SCL/12/2, SCL/13/1, SCL/13/2) extend within the western extents of Parcel 1, in Fields B1 and B4 to B7;
- Public rights of way (MCL/15/1 ECL/9/1, MCL/17/1, MCL/18/1, MCL/18/2 and MCL/20/2) are located to the east of Knowlhill Farm outside of the Solar PV areas;
- Public rights of way (ECL/7/1, ECL/7/2, ECL/8/1, ECL/9/2, ECL/10/1, ECL/10/2-ECL/10/5) extend south from Botolph Claydon to within the northern extent of Parcel 2, and continue as public rights of way (ECL/8/2, QUA/38/1, QUA41/1, QUA/42/2 AND MCL/22/1) to within the south of Parcel 2;
- Public rights of way (QUA/38/2, QUA/39/1, QUA/40/1, QUA/40/3, QUA/42/1 and GUN/34/1) extend from the southern boundary of Parcel 2 to lower lying ground to the south;
- Public rights of way (ECL/11/1, ECL/11/2, ECL/11/3, ECL/11/4) extend from Botolph Claydon to East Claydon following the route of Botyl Road then forking off-road close to the property Ivy Nook. ECL/11/1 extends to the west of Parcel 3;
- Public rights of way (ECL/3/1, ECL/3A/1, ECL/3/2, ECL/4/1, ECL/4/2, ECL/5/1, ECL/6/1 and HOG/6/1) extend east from East Claydon to within Parcel 3;
- Public rights of way (GRA1/1, GRA/2/1, GRA/2/2, GRA/3/1, GRA/3/2, GRA/4/1, GRA/10/1, GRA/11/1, WIS/1/2) extend from the eastern boundary of Parcel 3 towards Granborough; and
- Public rights of way (HOG/1/1, HOG/8/1, HOG/8/2, HOG/9/2, HOG/9/3, QUA/2/1, QUA/2/2, and QUA/9/1 extend to the east and south of Parcels 2 and 3 on the elevated land of Quainton Hill and Conduit Hill.

[46] Buckinghamshire Public Right of Way Map: https://prow.buckscc.gov.uk/standardmap.aspx

11.6.39. Other public rights of way within the Study area are addressed as part of the receptor group in which they are most closely located.

Other recreational and/or tourist receptors

11.6.40. Other recreational receptors within the Study area are indicated in **Figure 11.1** and **Figure 11.5** in **Volume 2**. The recreational receptors listed below are considered further within this preliminary assessment:

- Claydon House is open to the public to visit the house and gardens and is host to events such as the annual Towersey Festival; and
- Hogshaw Farm and Wildlife Park with rare breed farm animals, nature trails, hospitality and events throughout the year. The local footpath network (HOG/7/1 & ECL/7/2) runs south to north through the farm and extends into Parcel 2 to Botolph Claydon.

11.6.41. The recreational receptors listed below are open to visitors and fall within the Study area:

- Waddesdon Manor – located 5 km south of Field D28; and
- Wotton House – located 4.5 km south of Field D29.

11.6.42. Although within the ZTV, field study has demonstrated that visibility of Rosefield Solar Farm for people visiting Waddesdon Manor and Wotton House would be negligible. Therefore, an assessment of effects upon visitors has not been considered further within this preliminary assessment.

Future baseline

11.6.43. For the purposes of this preliminary assessment, the future baseline has been taken to be the same as the current baseline. Over the lifetime of Rosefield Solar Farm, agricultural practices and crops may change resulting in alterations to the baseline arable landscape. Climate change may expediate this change in the landscape; however, such change is difficult to predict with any certainty and it is therefore assumed that the baseline would remain unaltered in the absence of Rosefield Solar Farm.

11.7. Mitigation embedded into the design

11.7.1. **Chapter 3: Description of Rosefield Solar Farm** outlines the design principles for Rosefield Solar Farm. The project landscape architects were heavily involved in drafting the design principles which focus on the themes of Climate, People, Places and Value. Within each theme, a set of project principles have been developed along with more detailed design-specific principles and technical guidance, which provides detail on how the principles can be achieved.

11.7.2. The project landscape architects provided input into optioneering studies to identify fields most suitable for Solar PV, BESS and substation

development within the Site. Several fields were excluded from Rosefield Solar Farm, as outlined in **Table 11.5** below, on the basis that they would likely give rise to significant landscape or visual effects.

11.7.3. Following initial feasibility and optioneering studies and based on consultation feedback and the site work undertaken by the project landscape architects, bespoke buffers and offsets have been incorporated into the proposed design layout. In particular, increased offsets to those identified in the plans presented at public consultation have been incorporated from the Bernwood Jubilee Way, the settlement of Botolph Claydon, HS2 planting, established woodland and hedgerows and around certain residential properties in response to landscape advice.

11.7.4. Preliminary landscape proposals have been developed and embedded into the project design to provide landscape and visual mitigation for Rosefield Solar Farm. This is considered to be primary mitigation as it is embedded into the design. These proposals include new planting in the locations illustrated in **Figure 3.4** in **Volume 2**. Although the detail is yet to be developed, this preliminary assessment therefore assumes that there would be relatively extensive new hedgerow planting around the periphery of all fields containing Solar PV modules.

11.7.5. For the purposes of this preliminary assessment, the following assumptions have been made about the growth rate of newly planted hedgerows and trees, based upon industry standards and known growth rates:

- Newly planted hedgerows and woodland/shrub would be planted as young transplants or 'whips.' In Year 1 after construction, the planting stock would typically be approximately 0.6 m to 0.8 m high and contained within tree protector tubes;
- Hedgerows in Year 10 after construction would be 3.5 m in height. This makes an assumption that the plants do not put on much growth in the first planting season and then put on an average of 0.4 m growth each subsequent year. This means that all new hedgerows are considered to be at full maturity in Year 10 and are maintained at 3.5 m by ongoing management;
- New woodland/scrub planting established as transplants would be 4 m in height as it is not maintained at a lower height as is the case for hedgerows;
- Where hedgerow trees are planted as taller specimens or where mature stock is planted elsewhere, it is assumed that the trees would be planted as extra heavy standards and in Year 1 after construction these would have a height of 3 m to 3.5 m. By Year 10 after construction, it is assumed that these trees would have a height of approximately 6 m; and

- Except where vegetation is managed at a specific height (e.g. hedgerows), it is assumed that trees and scrub would continue to grow naturally over the remaining operational lifetime of Rosefield Solar Farm.

11.7.6. Embedded (primary) environmental mitigation measures that are considered to be an inherent part of Rosefield Solar Farm are detailed within **Chapter 5: Approach to the EIA**. The embedded mitigation measures relevant to landscape and visual amenity and the benefits these provide are outlined in **Table 11.5** below and are detailed and in **Figure 3.4** in **Volume 2**.

11.7.7. Buckinghamshire Council requested that potential changes in vegetation heights as may be required by the future management prescriptions, such as laying or coppicing of hedgerows or trees, be considered in the assessment of visual effects. However, as these prescriptions will primarily be required to rejuvenate declining hedge structure on an ad-hoc basis, it is not possible to predict where and when this might be required throughout the lifetime of Rosefield Solar Farm. This has therefore not been included in this preliminary assessment.

Table 11.5 – Embedded mitigation measures relevant to landscape and visual amenity

Embedded mitigation measures relevant to landscape and visual amenity	Benefit
Allow a 20 m offset from HS2 planting to the fence line.	To avoid impacts on planting undertaken as part of HS2 works.
Allow a 30 m offset from ancient woodlands.	To avoid impacts on established woodlands.
Minimum 10 m offset from hedgerows.	To avoid impacts on hedgerows and maintain historic field pattern.
Removal of Parcel 1a (Fields C1, C2 and C3) from Solar PV development.	To reduce impacts on landscape and visual receptors and protect visual amenity of walkers.
Removal of Knowl Hill (Field B17) and half of Field B9 from Solar PV development.	To reduce impacts on landscape and visual receptors including visitors to Claydon House and Gardens.
Removal of fields in the southern part of Parcel 2 (Fields D27 and D30 to D37) from Solar PV development.	To protect the landscape and special qualities of the Area of Attractive Landscape.

Embedded mitigation measures relevant to landscape and visual amenity	Benefit
55 m offset from Bernwood Jubilee Way and 20 m offset from Midshires Way.	To protect visual amenity of walkers
All other public rights of way will have a minimum 10 m offset from the fence line.	To protect visual amenity of walkers.
Removal of fields south-west of Botolph Claydon (Fields D1, D2, D3 North, and D5) from Solar PV development.	To protect the setting of Botolph Claydon.
Bespoke offset of residential properties from Solar PV development.	To protect the residential visual amenity of residents.
Minimum 250 m offset from BESS, Rosefield Substation and Collector Compounds.	To protect the residential visual amenity of residents.

11.8. Optionality

11.8.1. **Chapter 5: Approach to the EIA** sets out those elements of Rosefield Solar Farm for which optionality is present within the current design and sets out the scenarios assessed for the purpose of this PEIR.

11.8.2. The preliminary design principles as outlined in **Chapter 5: Approach to the EIA** and the preliminary parameter plans (**Figures 3.1** to **3.5** in **Volume 2**) set out the reasonable 'worst case scenario' that has been assessed within this chapter.

11.8.3. Two scenarios are considered for Rosefield Solar Farm to provide optionality regarding the siting of Rosefield Substation as set out in **Table 11.6** below. The two scenarios, which are dependent on the siting of the National Grid East Claydon Substation, consist of Rosefield Substation being located either to the north of Parcel 3, in Field E11, or to the south of Parcel 3 in Field E23. In addition, optionality for the location of the Satellite Collector Compounds is provided in Parcel 1 using either Field B10 or B23 (South).

Table 11.6 – Optionality scenarios assessed

Project element	Scenario assessed for this preliminary assessment
Scenario 1	
Rosefield Substation	This preliminary assessment assumes that Rosefield Substation would be located in Field E11.

Project element	Scenario assessed for this preliminary assessment
BESS	This preliminary assessment assumes that the BESS would be located in Fields D8, D9 and E23.
Collector Compounds	This preliminary assessment assumes that the main Collector Compound would be located in Fields E20, E21 E22 and E23 and Satellite Collector Compounds in Fields B10 or B23 (South) and Field D17.
Scenario 2	
Rosefield Substation	This preliminary assessment assumes that Rosefield Substation would be located in Field E23.
BESS	This preliminary assessment assumes that the BESS would be located in Fields D8, D9 and E23.
Collector Compounds	This preliminary assessment assumes that the main Collector Compound would be located in Fields E20, E21, E22 and E23 and Satellite Collector Compounds in Fields B10 or B23 (South) and Field D17.

Preliminary assessment assumptions

11.8.4. In each case, the extent of the project elements has made use of the indicative height parameter plans (presented in **Figure 3.1** in **Volume 2**) to inform a worst-case scenario for this assessment of landscape and visual effects.

11.9. Approach to the preliminary assessment

11.9.1. The following provides a summary of the methodology adopted for the preliminary assessment of the likely significant landscape and visual effects of Rosefield Solar Farm. Full details of the assessment methodology, including assessment criteria, are provided in **Appendix 11.1** in **Volume 3**.

11.9.2. In accordance with GLVIA3[47], the significance of landscape and visual effects is determined by considering in tandem the sensitivity of landscape and visual receptors (landscape elements, landscape character areas, landscape designations and groups of people who may be affected by changes in visual amenity) and the magnitude of effect arising from Rosefield Solar Farm.

[47] Landscape Institute and Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment (Third Edition).

11.9.3. This preliminary assessment has been informed by initial desk studies and site visits to identify receptors. The desk study included the preparation of several ZTV plans (presented in **Figures 11.7** to **11.14** in **Volume 2**) to identify potential areas of visibility of Rosefield Solar Farm. This information has been used to aid the identification of the Study area and receptors likely to be affected. Viewpoints are used as 'sample' locations to inform the assessment of effects on receptors.

11.9.4. This preliminary assessment provides a full baseline study, including judgements of sensitivity for each receptor, and an initial indication of likely significant effects. It should be noted, however, that in the interests of proportionality, a detailed justification for the judgements made regarding magnitude of effect and significance of effects is not provided in this preliminary assessment. The Landscape and Visual Impact Assessment presented in the ES will provide a full justification for all judgements.

11.9.5. For this preliminary assessment, the likely effects on all identified receptors are reported, together with an initial consideration of whether the effect is significant or not.

Landscape and visual sensitivity

11.9.6. Sensitivity (described as 'high', 'medium' or 'low') is judged by combining component judgments about the value and susceptibility of the receptor, as illustrated in **Table 11.7** and **Table 11.8**. An explanation of how susceptibility and value has been determined is provided in **Appendix 11.1** in **Volume 3**. Detailed susceptibility and value criteria for landscape receptors are established in **Appendix 11.3** in **Volume 3** whilst detailed visual susceptibility and value criteria are set out in **Appendix 11.1** in **Volume 3**.

11.9.7. It should be noted that intermediate assessments of value or susceptibility may be applied (e.g., 'high/medium', 'medium/low' or 'national/regional', 'regional/community'). Likewise, when combining susceptibility and value to determine sensitivity, an intermediate assessment is adopted where overall sensitivity is judged to lie between levels. In all instances, professional judgement is employed and the tables below should not be interpreted rigidly to give a specific answer. Note that a greater weight is intentionally attributed to the susceptibility of the visual receptor than to value. This is to reflect the fact that in relative terms, few views are recognised through designation or cultural reference, whilst susceptible visual receptors tend to be susceptible whether or not the view experienced is the subject of any recognised value. This approach still allows, where appropriate, for the recognition of particularly high or low value views.

Table 11.7 – Landscape sensitivity criteria

		Susceptibility		
		High	Medium	Low
Value	National	High	High/Medium	Medium
	Regional	High/Medium	Medium	Medium/Low
	Community	Medium	Medium/Low	Low

Table 11.8 – Visual sensitivity criteria

		Susceptibility		
		High	Medium	Low
Value	National	High	High/Medium	Medium
	Regional	High/Medium	High/Medium	Medium/Low
	Community	High/Medium	Medium	Low

Landscape and visual magnitude of effect

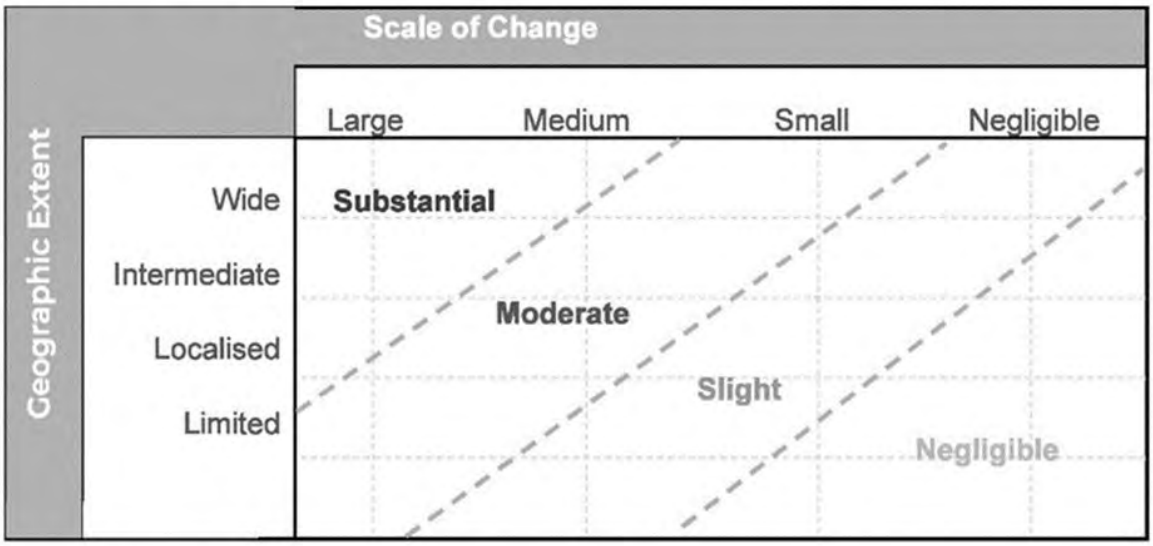
11.9.8. The magnitude of effect arising from Rosefield Solar Farm (described as 'substantial', 'moderate', 'slight' or 'negligible') is assessed in terms of its scale, geographic extent of the area or receptor that is influenced and its duration.

11.9.9. Scale of change (expressed as 'large', 'medium', 'small' or 'negligible') is the first and primary factor in determining magnitude. Geographical extent and duration of the effect are modifying factors to the overall magnitude judgement, which may be higher if the effect is particularly widespread and/or long lasting, or lower if it is constrained in geographic extent and/or timescale.

11.9.10. The diagrams presented below in **Plate 11.1** illustrate in outline how these two modifying factors are considered in a two-stage process. A judgement is first formed about the scale of the change to the landscape or visual receptor. The geographic extent of the effect is then considered as a modifying influence in the first part of **Plate 11.1** (Stage 1).

11.9.11. The result or outcome of Stage 1 is then considered again in relation to the duration of the effect as illustrated in the second part of **Plate 11.1**. The outcome of Stage 2 is the overall magnitude of effect judgement reported in the assessment. **Plate 11.1** is not intended to be interpreted rigidly as a chart to provide definitive answers; professional judgement is employed as appropriate to arrive at an overall judgement on the magnitude of effect. A definition of the terms used in the diagrams in **Plate 11.1** is provided in **Appendix 11.1** in **Volume 3**.

Stage 1 - Modifying Influence of Geographic Extent on Magnitude of Effect



Stage 2 - Modifying Influence of Duration on Magnitude of Effect

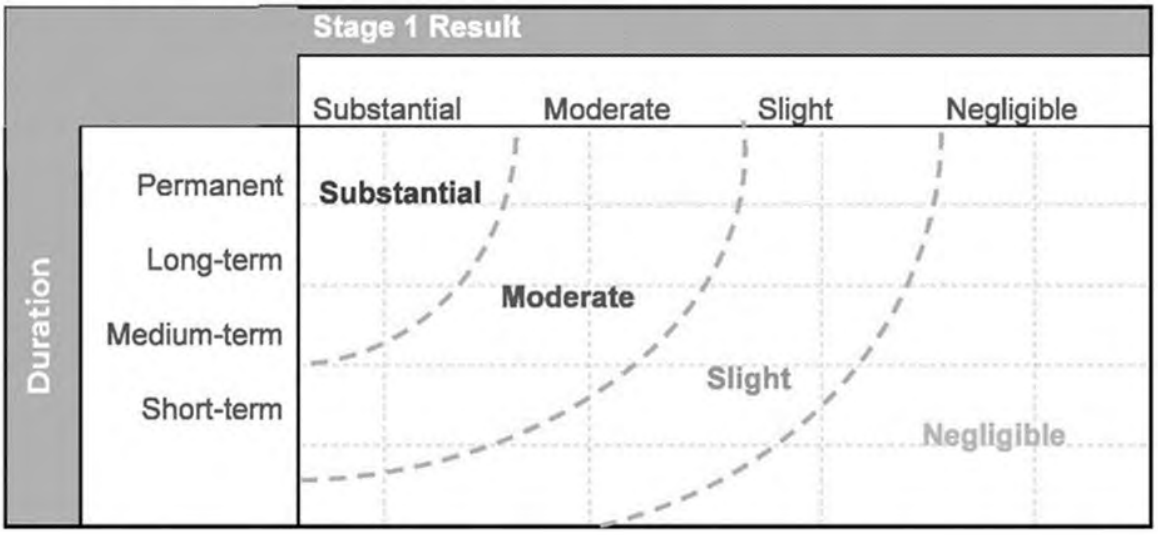


Plate 11.1 – Illustration of how magnitude of effect is established

11.9.12. Where magnitude of effect (or other judgements) is judged to lie between levels, an intermediate assessment is adopted and is expressed as e.g. 'moderate/slight'.

Landscape and visual significance of effects

11.9.13. The significance of a landscape or visual effect is assessed through professional judgement, combining the sensitivity of the receptor with the predicted magnitude of effect, as summarised in **Table 11.9**. **Table 11.9** is not used as a prescriptive tool and illustrates the typical outcomes, allowing for the exercise of professional judgement.

Table 11.9 – Significance of effect criteria

		Magnitude of effect			
		Negligible	**Slight**	**Moderate**	**Substantial**
Receptor sensitivity	**Low**	Negligible	Minor	Moderate/ Minor	Moderate
	Medium	Minor/ Negligible	Moderate/ Minor	Moderate	Major/ Moderate
	High	Minor	Moderate	Major/ Moderate	Major

11.9.14. Where the significance of effect is classified as 'major' or 'major/moderate', this is considered to be '**significant'**. Where 'moderate' effects are predicted, professional judgement will be applied to determine whether the effect is significant or not. Effects of 'moderate/minor', 'minor', 'minor/negligible' or 'negligible' significance are considered to be '**not significant**'.

Nature of effects

11.9.15. Landscape and visual effects can be beneficial or adverse and, in some instances, may be considered neutral in nature. Neutral effects are those which overall are neither adverse nor beneficial, but may incorporate a combination of both. Whether an effect is beneficial, neutral or adverse is identified based on professional judgement.

11.9.16. Changes to rural landscapes involving construction of utilitarian objects of a large scale are generally considered to be adverse and in this preliminary assessment, it has been assumed that where new infrastructure is introduced into the landscape or views, this would generally constitute an adverse effect.

Extent of assessment in this PEIR

11.9.17. The purpose of a Landscape and Visual Impact Assessment when produced in the context of an EIA is to identify and report any likely significant landscape and visual effects.

11.9.18. In this preliminary assessment, a professional judgement has been made as to whether effects have the potential to be identified as significant based on the parameters outlined and an initial assessment of sensitivity and magnitude of effect. Final statements of significance will be reported in the ES once the design and mitigation has been fixed for the purposes of the DCO application.

Night-time assessment

11.9.19. A night-time assessment has not been included in this preliminary assessment. It is unlikely that night-time effects have the potential to be significant as solar farms are not usually lit at night. The need for a night-

time assessment will be reviewed at the ES stage when further details are available and if necessary, a methodology for the night-time assessment will be set out in the ES.

Residential visual amenity assessment

11.9.20. With respect to visual impact, the focus of a Landscape and Visual Impact Assessment is on public views and public visual amenity. Residential Visual Amenity Assessment is a stage beyond Landscape and Visual Impact Assessment and focuses exclusively on private views and private visual amenity and may be used by the decision maker when weighing potential effects on residential amenity in the planning balance.

11.9.21. Landscape Institute Technical Guidance Note 02/19 (TGN 2/19)[48] notes that:

"*Changes in views and visual amenity are considered in the planning process. In respect of private views and visual amenity, it is widely known that, no one has 'a right to a view" and "It is not uncommon for significant adverse effects on views and visual amenity to be experienced by people at their place of residence as a result of introducing a new development into the landscape. In itself this does not necessarily cause particular planning concern. However, there are situations where the effect on the outlook/visual amenity of a residential property is so great that it is not generally considered to be in the public interest to permit such conditions to occur where they did not exist before*."

11.9.22. A detailed Residential Visual Amenity Assessment will be presented in the ES and will identify where the visual effects on residential visual amenity are of such a nature or magnitude that they may need to be considered in the overall balance of 'Residential Amenity' or 'Living Conditions.'

11.9.23. Information relating to residential visual amenity gathered to date and a methodology for the full assessment to be included in the ES, is presented in **Appendix 11.5** in **Volume 3**.

Distances

11.9.24. Where distances are given in this chapter, these are approximate distances between the nearest above ground feature of Rosefield Solar Farm based in **Figure 3.1** in **Volume 2** (not the Site boundary) and the nearest part of the receptor in question unless explicitly stated otherwise.

[48] Landscape Institute (2019). Landscape Institute Technical Guidance Note 02/19: Residential Visual Amenity Assessment.

Visual aids

11.9.25. ZTV maps have been generated using Geographical Information Systems (GIS) to assist in identifying areas where visibility of Rosefield Solar Farm may be visible and to indicate its potential influence in the wider landscape. The ZTVs are also used to identify potential viewpoints and to illustrate areas from which Rosefield Solar Farm would not be visible.

11.9.26. The ZTVs illustrated in **Figures 11.7** to **11.14** in **Volume 2** are based on a number of variants to illustrate different levels of potential visibility: A bare earth ZTV illustrates a worst case scenario with no screening elements; a standard screening ZTV, takes account of buildings and significant blocks of woodland in the landscape; and a detailed screening uses LIDAR data to provide the most detailed review of visibility.

11.9.27. The following ZTVs in **Volume 2** have been prepared to help illustrate the potential visibility of Rosefield Solar Farm:

- **Figure 11.7a – Solar Array ZTV – Bare Earth;**
- **Figure 11.7b – Solar Array ZTV Area 1 – Bare Earth;**
- **Figure 11.7c – Solar Array ZTV Area 2 – Bare Earth;**
- **Figure 11.7d – Solar Array ZTV Area 3 – Bare Earth;**
- **Figure 11.8a – Solar Array ZTV – Standard Screening;**
- **Figure 11.8b – Solar Array ZTV Area 1 – Standard Screening;**
- **Figure 11.8c – Solar Array ZTV Area 2 – Standard Screening;**
- **Figure 11.8d – Solar Array ZTV Area 3 – Standard Screening;**
- **Figure 11.9a – Solar Array ZTV – Detailed Screening;**
- **Figure 11.9b – Solar Array ZTV Area 1 – Detailed Screening;**
- **Figure 11.9c – Solar Array ZTV Area 2 – Detailed Screening;**
- **Figure 11.9d – Solar Array ZTV Area 3 – Detailed Screening;**
- **Figure 11.10a - Bare Earth ZTV Siting Zone 6 m Structures Parcel 1 Scenario 1;**
- **Figure 11.10b - Screening ZTV Siting Zone 6 m Structures Parcel 1 Scenario 1;**
- **Figure 11.11a - Bare Earth ZTV Siting Zone 6 m Structures Parcel 1 Scenario 2;**
- **Figure 11.11b - Screening ZTV Siting Zone 6 m Structures Parcel 1 Scenario 2;**
- **Figure 11.12a - Bare Earth ZTV Siting Zone 6 m Structures Parcel 2;**
- **Figure 11.12b - Screening ZTV Siting Zone 6 m Structures Parcel 2;**

- **Figure 11.13a - Bare Earth ZTV Siting Zone 6 & 15 m Structures Parcel 3 Scenario 1;**
- **Figure 11.13b - Screening ZTV Siting Zone 6 & 15 m Structures Parcel 3 Scenario 1;**
- **Figure 11.14a - Bare Earth ZTV Siting Zone 6 & 15 m Structures Parcel 3 Scenario 2;** and
- **Figure 11.14b - Screening ZTV Siting Zone 6 & 15 m Structures Parcel 3 Scenario 2.**

11.9.28. Annotated photographs and photowires of the existing views at all viewpoints are provided in **Volume 4**. The method of visualisation selected has been informed by Landscape Institute Technical Guidance Note 06/19[49], with annotated photographs and photowires being the most appropriate approach at this stage before the design is finalised.

11.9.29. The methodology for production of the ZTVs and the visualisations is described in **Appendix 11.1** in **Volume 3**. Photomontage visualisations will be provided in the ES for key viewpoint locations yet to be agreed with Buckinghamshire Council.

11.10. Assessment of likely effects (without additional mitigation)

General approach to existing landscape fabric

11.10.1. The Design Principles underlying the evolution of Rosefield Solar Farm (**Chapter 3: Description of Rosefield Solar Farm**) include the commitment to retain existing vegetation wherever reasonably practicable to sustain the fabric of the Site and aid assimilation of development into its context. Internal access tracks and cable routes would use existing tracks, hedgerow crossings and/or gaps in the hedgerows wherever reasonably practicable.

11.10.2. Whilst some minor vegetation removal may be unavoidable, it is anticipated that this would be minimal and that there would be an overall net gain in quantity and quality of landscape fabric once mitigation planting becomes established.

Preliminary viewpoint analysis

11.10.3. The 37 viewpoints, illustrated in **Figure 11.6** in **Volume 2**, have been used to represent the main landscape and visual receptors found in the Study area.

[49] Landscape Institute (2019). Landscape Institute Technical Guidance Note 06/19: Visual Representation of Development Proposals.

11.10.4. The final Landscape and Visual Impact Assessment presented in the ES will include a detailed viewpoint assessment conducted from an agreed selection of viewpoints. These are likely to include the 37 viewpoints assessed in this preliminary assessment but are subject to refinement following further discussion with Buckinghamshire Council and other consultees. In order to inform the assessment of likely significant landscape and visual effects arising as a result of Rosefield Solar Farm in this preliminary assessment, a preliminary viewpoint analysis is presented in **Appendix 11.4** in **Volume 3**.

11.10.5. The location of the viewpoints is shown on the ZTVs presented in **Figures 11.7** to **11.14** in **Volume 2**.

11.10.6. Annotated panoramic photographs and photowires are presented to illustrate the potential extent of development visible at each viewpoint location in **Volume 4**.

11.10.7. The preliminary viewpoint analysis presented in **Appendix 11.4** in **Volume 3** identifies which part or parts of Rosefield Solar Farm are likely to be visible from each viewpoint, based on **Chapter 3: Description of Rosefield Solar Farm**.

Sensitivity of receptors

Landscape sensitivity of appraisal

11.10.8. In order to inform the preliminary assessment of likely significant effects on landscape character, a landscape sensitivity appraisal has been undertaken considering the various landscape susceptibility and value criteria, which combine to determine landscape sensitivity to the type of development proposed. The appraisal has drawn upon observations contained within the Aylesbury Landscape Character Assessment[50] (as summarised in **Appendix 11.2** in **Volume 3**) and the document, 'Defining the special qualities of local landscape designations in Aylesbury Vale District'[51]; as well as observations made in the field during the baseline assessment of landscape character. It should be noted that some local character areas extend beyond the Study area. The conclusions regarding landscape sensitivity, therefore, relate specifically to the tract of the LCAs within the Study area.

[50] The Aylesbury Vale Landscape Character Assessment, (2008). Land Use Consultants https://www.buckinghamshire.gov.uk/planning-and-building-control/planning-policy/landscape-policy-and-assessments/landscape-character-assessments/

[51] Defining the Special Qualities of local landscape designations in Aylesbury Vale District, (2016). Land Use Consultants, available by request from planningpolicyteam.bc@buckinghamshire.gov.uk

11.10.9. A detailed landscape sensitivity appraisal is presented in **Appendix 11.3** in **Volume 3**. The principal findings of the appraisal are summarised below in **Table 11.10**.

Table 11.10 – Summary of landscape sensitivity

Landscape	Susceptibility	Value	Sensitivity
LCA 5.4: Twyford Vale	Low	Community	Low
LCA 5.6: Claydon Valley	Medium/Low	Community	Low
LCA 5.7: Hogshaw Claylands	Medium	Community	Medium/Low
LCA 5.8: North Marston Undulating Claylands	Medium	Community	Medium/Low
LCA 7.3: Claydon Bowl	Medium	Regional	Medium
LCA 9.1: Finemere Hill	High	Regional	High/Medium
LCA 9.2: Quainton Hill	High	Regional	High/Medium
LCA 9.3: Pitchcott-Whitchurch Ridge	High	Regional	High/Medium

Sensitivity of visual receptors

11.10.10. Based on analysis to date, the visual receptors identified in **Table 11.11** are to be taken forward for further assessment in the Landscape and Visual Impact Assessment in the ES. The sensitivity of these receptors varies and is also indicated in **Table 11.11**.

11.10.11. Further information on the closest residential properties to Rosefield Solar Farm can be found above in **Table 11.3** and in **Appendix 11.5** in **Volume 3**.

11.10.12. Visual receptor locations are shown in **Figure 11.5** in **Volume 2**.

Table 11.11 – Summary of visual receptor sensitivity

Visual receptor	Susceptibility	Value	Sensitivity
Settlements			
Botolph Claydon, Granborough, North Marston, Oving, Steeple Claydon, Winslow	High	Community	High/Medium

Visual receptor	Susceptibility	Value	Sensitivity
Users of main roads			
Orchard Way/Calvert Road, Claydon Road, East Claydon Road, Queen Catherine Road	Medium	Community	Medium
Users of main transport routes			
East West Rail	Low	Community	Low
Users of recreational routes			
NCN Route No. 50	High	National	High
Long distance ways: The Midshires Way; Swan's Way; and Outer Aylesbury Ring	High	Regional	High/Medium
Promoted routes: Bernwood Jubilee Way; North Buckinghamshire Way and Matthew's Way	High	Regional	High/Medium
Public rights of way & lanes south of Steeple Claydon and within Parcel 1	High	Community/ Regional	High/Medium
Public rights of way & lanes south of Botolph Claydon and within Parcel 2	High	Community/ Regional	High/Medium
Public rights of way and lanes between Botolph Claydon and East Claydon	High	Community/ Regional	High/Medium
Public rights of way and lanes east of East Claydon	High	Community/ Regional	High/Medium
Public rights of way and lanes north of Quainton	High	Regional	High/Medium
Users of other recreational receptors			
Claydon House	High	Regional	High/Medium

Visual receptor	Susceptibility	Value	Sensitivity
Hogshaw Farm and Wildlife Park	High	Regional	High/Medium

11.11. Additional mitigation

11.11.1. It is unlikely that any additional (secondary) landscape or visual mitigation, over and above the embedded (primary) mitigation outlined in **Section 11.7** above, would be effective during the construction/decommissioning phases. However, once more detail is available about the likely construction/decommissioning activities, this will be reviewed to identify if any additional mitigation is appropriate in the ES.

11.11.2. For the purposes of this preliminary assessment, with regards to the operational (including maintenance) phase, it is assumed that all new hedgerow and woodland planting would be incorporated and embedded into the design of Rosefield Solar Farm (refer to **Section 11.7** above). It is therefore treated as primary (embedded) mitigation rather than additional (secondary) mitigation.

11.11.3. An Outline Landscape and Ecological Management Plan will be submitted in support of the DCO application. The Outline Landscape and Ecological Management Plan is expected to include the principles of the management (which may primarily have a biodiversity enhancement function) of the proposed environmental mitigation and enhancement areas, including planting, during the operational (including maintenance) phase of Rosefield Solar Farm.

11.12. Assessment of residual effects (with additional mitigation)

11.12.1. **Table 11.12** summarises the likely landscape and visual effects during construction/decommissioning, and Year 1 and Year 10 of operation on the receptors identified above. Two assessment scenarios are provided in **Table 11.12** for instances where effects could differ as a result of the two different locations of Rosefield Substation in Parcel 3 (refer to **paragraph 11.8.3** above). No such difference in effects would be experienced as a result of the optionality for the location of the Satellite Collector Compounds in Parcel 1.

11.12.2. Changes to rural landscapes involving construction of utilitarian objects of a large scale are generally considered to be adverse and in this preliminary assessment, it has been assumed that where new infrastructure is introduced into the landscape or views, this would generally constitute an adverse effect.

Table 11.12 – Assessment of likely significant effects on identified receptors

Receptor	Sensitivity	Summary of likely significant effects
Landscape receptors		
LCA 5.4: Twyford Vale	Low	There would be an **indirect** and **medium** to **small** scale of change to landscape character to the LCA, which would extend in a diminishing fashion to *circa* 2 km north of Parcel 1 towards Steeple Claydon and to the west. Beyond this distance, the scale of change would reduce to **negligible** due to the screening effect of intervening topography and vegetation. Overall, only a localised extent of the LCA would be affected by Rosefield Solar Farm. During construction and decommissioning, there would be a **slight** magnitude of effect and an effect of **minor adverse** significance, to the extents as described above, which would constitute a **not significant** effect on landscape character within this LCA. During Year 1 of operation, there would be a **moderate** to **slight** magnitude of effect and an effect of **minor adverse** significance, which would constitute a **not significant** effect on landscape character within this LCA. During Year 10 of operation, although the scale of change and overall significance of effect is likely to be reduced by mitigation (including some beneficial enhancement of landscape fabric), it is likely that effects on landscape character would remain **minor adverse**, which would constitute a **not significant** effect on the LCA.
LCA 5.6: Claydon Valley	Low	**Scenario 1**: There would be a **direct** and **large** to **medium** scale of change within a small number of host fields in this LCA, which would extend in a diminishing fashion to *circa* 1 km from Rosefield Solar Farm within this LCA. Beyond this distance, there would be no greater than a **small** or **negligible** scale of change in character. Only a small proportion of Rosefield Solar Farm (northernmost field of Parcel 3) would be located within the LCA, albeit the Rosefield Substation would be visible above and between intervening vegetation at a local level geographically, particularly from the north/north-east. The extent of effect would therefore be localised and the majority of the LCA would be unaffected by Rosefield Solar Farm.

Receptor	Sensitivity	Summary of likely significant effects
		During construction and decommissioning, there would be a **moderate** to **slight** magnitude of effect and an effect of **minor adverse** significance to the extents as described above. This would constitute a **not significant** effect on landscape character within the part of the LCA described above. During Year 1 of operation, there would be a **moderate** magnitude of effect and an effect of **moderate/minor adverse** significance. This would constitute a **not significant** effect on landscape character within the part of the LCA described above. During Year 10 of operation, although the scale of change and overall significance of effect is likely to be reduced by mitigation (including some beneficial enhancement of landscape fabric), the effects on landscape character would likely remain **moderate/minor adverse** significance, which would constitute a **not significant** effect on the LCA. **Scenario 2**: The scale of change would reduce to **medium** due to the location of Rosefield Substation in Field E23 from where it would be less visible. The extent of effects is still considered localised. During construction and decommissioning, there would be a **moderate** to **slight** magnitude of effect and an effect of **minor adverse** significance to the extents as described above. This would constitute a **not significant** effect on landscape character within the part of the LCA described above. During Year 1 of operation, there would be a **moderate** magnitude of effect and an effect of **moderate/minor adverse** significance. This would constitute a **not significant** effect on landscape character within the part of the LCA described above. During Year 10 of operation, although the scale of change and overall significance of effect is likely to be reduced by mitigation (including some beneficial enhancement of landscape fabric), the effects on landscape character would likely remain unchanged, which would constitute a **not significant** effect on the LCA.
LCA 5.7: Hogshaw Claylands	Medium/ Low	**Scenario 1**: There would be a **direct** and **large** to **medium** scale of change to landscape character to the fields of the Site within Parcel 3; a **medium** scale of

Receptor	Sensitivity	Summary of likely significant effects
		change would extend in a diminishing fashion to circa 1.5 km east from Rosefield Solar Farm within this LCA. Beyond this distance, change would reduce to **small** or **negligible** scale due to the screening effect of intervening topography and vegetation. The location of Rosefield Substation towards the northern extent of Parcel 3 would somewhat reduce its visibility from within the wider LCA and locate it adjacent to the National Grid East Claydon Substation in a neighbouring LCA. Overall, a wide extent of the LCA would be affected by Rosefield Solar Farm. During construction and decommissioning, there would be a **moderate** magnitude of effect and an effect of **moderate/minor** to the extents as described above. This would constitute a **not significant** effect on landscape character within this LCA. During Year 1 of operation, there would be a **substantial** magnitude of effect and an effect of **moderate adverse** significance. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. During Year 10 of operation, although the scale of change and overall significance of effect is likely to be reduced by mitigation (including some beneficial enhancement of landscape fabric), it is likely that effects on landscape character would remain of **moderate adverse** significance, which would constitute a **significant** effect on the LCA. **Scenario 2**: The location of Rosefield Substation to the southern extent of Parcel 3 would somewhat extend the visibility of 15 m structures within the LCA and locate it in more open countryside. There would be a **direct** and **large** scale of change to landscape of the site; a **large** to **medium** scale of change would extend in a diminishing fashion to circa 1 km from Rosefield Solar Farm within this LCA. Beyond this distance, change would reduce to **small** scale due to the screening effect of intervening topography and vegetation. Overall, a wide extent of the LCA would be affected by Rosefield Solar Farm. During construction and decommissioning, there would be a **moderate** magnitude of effect and an effect of **moderate adverse** significance to the extents as described above. Noting that moderate effects may or may not be significant, it is the professional opinion of

Receptor	Sensitivity	Summary of likely significant effects
		the assessors that in this instance, the effect would be **significant**. During Year 1 of operation, there would be a **substantial** magnitude of effect and an effect of **major/moderate adverse** significance, which would constitute a **significant** effect on landscape character within this LCA. During Year 10 of operation, although the scale of change and overall significance of effect is likely to be reduced by mitigation (including some beneficial enhancement of landscape fabric), it is likely that effects on landscape character would remain of **major/moderate adverse** significance, which would constitute a **significant** effect on landscape character within this LCA.
LCA 5.8: Westcott Claylands	Medium/ Low	**Scenario 1**: There would be an **Indirect** and **medium** scale of change to landscape character from the elevated western edge of the LCA, which lies *circa* 1-2.5 km to the east of Rosefield Solar Farm. Beyond this distance, change would reduce to **small** or **negligible** scale due to the screening effect of intervening topography and vegetation. The location of Rosefield Substation towards the northern extent of Parcel 3 would somewhat reduce its visibility from within the wider LCA and locate it adjacent to the National Grid East Claydon Substation in a neighbouring LCA. A localised extent of the LCA would be affected by Rosefield Solar Farm. During construction and decommissioning, there would be a **moderate** to **slight** magnitude of effect and an effect of **moderate/minor adverse** significance to the extents as described above. This would constitute a **not significant** effect on landscape character within this LCA. During Year 1 of operation, there would be a **moderate** magnitude of effect and an effect of **moderate adverse** significance to the extents as described above. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. During Year 10 of operation, although the scale of change and overall significance of effect is likely to be reduced by mitigation (including some beneficial enhancement of landscape fabric), it is likely that effects on landscape character would remain of **moderate**

Receptor	Sensitivity	Summary of likely significant effects
		adverse significance. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. **Scenario 2**: The location of Rosefield Substation to the southern extent of Parcel 3 would potentially increase the scale of change to within the neighbouring LCA 5.7 and locate it in more open countryside. However, the scale of change would remain **medium** from *circa* 1-2.5 km to the east of Rosefield Solar Farm, reducing to **small** or **negligible** scale of change beyond. During construction and decommissioning, there would be a **moderate** to **slight** magnitude of effect and an effect of **moderate/minor adverse** significance to the extents as described above. This would constitute a **not significant** effect on landscape character within this LCA. During Year 1 of operation, there would be a **moderate** magnitude of effect and an effect of **moderate adverse** significance to the extents as described above. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. During Year 10 of operation, although the scale of change and overall significance of effect is likely to be reduced by mitigation (including some beneficial enhancement of landscape fabric), it is likely that effects on landscape character would remain of **moderate adverse** significance. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**.
LCA 7.3: Claydon Bowl	Medium	**Scenario 1**: There would be a **direct** and **large** scale of change to landscape character of host fields, which would include all of Parcel 1 and the north of Parcel 2; a **medium** scale of change would extend in a diminishing fashion to *circa* 2 km north of Parcel 1 towards Steeple Claydon and to the west of Parcel 2. Beyond this distance, change would reduce to **small** or **negligible** scale due to the screening effect of intervening topography and vegetation. The location of Rosefield Substation towards the northern extent of Parcel 3 would somewhat reduce its visibility. Overall, a wide extent of the LCA would be affected by Rosefield Solar Farm.

Receptor	Sensitivity	Summary of likely significant effects
		During construction and decommissioning, there would be a **moderate** magnitude of effect and an effect of **moderate adverse** significance to the extents as described above. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. During Year 1 of operation, there would be a **substantial** magnitude of effect and an effect of **major/moderate adverse** significance, which would constitute a **significant** effect on landscape character within this LCA. During Year 10 of operation, although the scale of change and overall significance of effect is likely to be reduced by mitigation (including some beneficial enhancement of landscape fabric), it is likely that effects on landscape character would remain of **major/moderate adverse** significance, which would constitute a **significant** effect on the LCA. **Scenario 2**: The location of Rosefield Substation to the southern extent of Parcel 3 would potentially increase its visibility to the eastern edge of the LCA. However, this would not further increase the extents of views experienced in Scenario 1 already assessed as wide. It is therefore likely that the overall magnitude of effect would remain the same as Scenario 1 for all stages of Rosefield Solar Farm. During construction and decommissioning, there would be an effect of **moderate adverse** significance to the extents as described above. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. During Year 1 of operation, there would be an effect of **major/moderate adverse** significance, which would constitute a **significant** effect on landscape character within this LCA. During Year 10 of operation, although the scale of change and overall significance of effect is likely to be reduced by mitigation (including some beneficial enhancement of landscape fabric), it is likely that effects on landscape character would remain of **major/moderate adverse** significance, which would constitute a **significant** effect on the LCA.

Receptor	Sensitivity	Summary of likely significant effects
LCA 9.1: Finemere Hill	High/ Medium	There would be a **direct** and **large** scale of change to landscape character of the host fields, to the south of Parcel 2; a **medium** scale of change would extend in a diminishing fashion to the north-east of Parcel 2 to *circa* 1 km. Outside of this area, change would reduce to **small** or **negligible** scale due to the screening effect of intervening topography and vegetation. Overall, a localised extent of the LCA would be affected by Rosefield Solar Farm; the location of Rosefield Substation in either the north or south of Parcel 3 would have no discernible effect on LCA 9.1. During construction and decommissioning, there would be a **moderate** to **slight** magnitude of effect and an effect of **moderate adverse** significance, to the extents as described above. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. During Year 1 of operation, there would be a **substantial** to **moderate** magnitude of effect and an effect of **major/moderate adverse** significance, which would constitute a **significant** effect on landscape character within this LCA. During Year 10 of operation, although the scale of change and overall significance of effect is likely to be reduced by mitigation (including some beneficial enhancement of landscape fabric), it is likely that effects on landscape character would remain of **major/moderate adverse** significance, which would constitute a **significant** effect on the LCA.
LCA 9.2: Quainton Hills	High/ Medium	**Scenario 1**: There would be an **indirect** and **large** to **medium** scale of change to landscape character over an intermediate extent, with Rosefield Solar Farm clearly visible across the east facing slopes of Parcel 2 at distances over 1 km and within the flatter landscape of Parcel 3 at distances over 2 km; the location of Rosefield Substation towards the northern extent of Parcel 3 would somewhat reduce its scale with distance and would locate it adjacent to the National Grid East Claydon Substation in a neighbouring LCA. During construction and decommissioning, there would be **moderate** to **slight** magnitude of effect and an effect of **moderate adverse** significance to the extents as described above. Noting that moderate effects may or

Receptor	Sensitivity	Summary of likely significant effects
		may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. During Year 1 of operation, there would be a **substantial** to **moderate** magnitude of effect and an effect of **major/moderate adverse** significance, which would constitute a **significant** effect on landscape character within this LCA. During Year 10 of operation, although the scale of change and overall significance of effect is likely to be reduced by mitigation (including some beneficial enhancement of landscape fabric), it is likely that effects on landscape character would remain of **major/moderate adverse** significance, which would constitute a **significant** effect on the LCA. **Scenario 2**: The location of the Rosefield Substation to the southern extent of Parcel 3 would bring it somewhat closer to LCA 9.2. However, the overall magnitude of effect would remain the same as Scenario 1 for all stages of Rosefield Solar Farm. During construction and decommissioning, there would therefore be an effect of **moderate adverse** significance. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. During Year 1 of operation, there would be an effect of **major/moderate adverse** significance, which would constitute a **significant** effect on landscape character within this LCA. During Year 10 of operation, although the scale of change and overall significance of effect is likely to be reduced by mitigation (including some beneficial enhancement of landscape fabric), it is likely that effects on landscape character would remain of **major/moderate adverse** significance, which would constitute a **significant** effect on the LCA.
LCA 9.3 Pitchcott-Whitchurch Ridge	High/ Medium	**Scenario 1**: There would be an **indirect** and **medium** to **small** scale of change to landscape character, with Rosefield Solar Farm clearly visible across the east facing slopes of Parcel 2 and within the flatter landscape of Parcel 3. These views would be experienced at distances beyond 3.7 km and 4.5 km respectively from

Receptor	Sensitivity	Summary of likely significant effects
		Rosefield Solar Farm; the location of the Rosefield Substation towards the northern extent of Parcel 3 would somewhat reduce its scale with distance and would locate it adjacent to National Grid East Claydon Substation in a neighbouring LCA. Only a limited extent of the LCA would be affected by Rosefield Solar Farm. During construction and decommissioning, there would be a **slight** to **negligible** magnitude of effect and an effect of **minor adverse** significance, which would constitute a **not significant** effect on landscape character within this LCA. During Year 1 of operation, there would be a **slight** magnitude of effect and an effect of **moderate/minor adverse** significance, which would constitute a **not significant** effect on landscape character. During Year 10 of operation, although the scale of change and overall significance of effect is likely to be reduced by mitigation (including some beneficial enhancement of landscape fabric), it is likely that effects on landscape character would remain of **moderate/minor adverse** significance, which would constitute a **not significant** effect on landscape character. **Scenario 2**: The location of Rosefield Substation to the southern extent of Parcel 3 would bring it somewhat closer to LCA 9.3. However, it would still be viewed at considerable distance and the overall magnitude of effect would remain the same as Scenario 1 for all stages of Rosefield Solar Farm. During construction and decommissioning, there would therefore be an effect of **minor adverse** significance, which would constitute a not significant effect. During Year 1 of operation, there would be an effect of **moderate/minor adverse** significance, which would constitute a **not significant** effect on landscape character. During Year 10 of operation, although the scale of change and overall significance of effect is likely to be reduced by mitigation (including some beneficial enhancement of landscape fabric), it is likely that effects on landscape character would remain of **moderate/minor adverse** significance, which would constitute a **not significant** effect on the LCA.

Receptor	Sensitivity	Summary of likely significant effects
Visual receptors - settlements		
Addington, East Claydon, Grendon Underwood, Hillesden Hamlet, Horwood, Middle Claydon, Padbury, Poundon, Preston Bisset, Swanbourne, Westcott, Waddesdon	High/ medium	Views towards the Site are not possible even for those properties on the periphery of these settlements as potential views are screened by intervening vegetation. It is unlikely there would be any views of Rosefield Solar Farm from these settlements, and the scale of change is considered to be **negligible**. During construction and decommissioning, Year 1 and Year 10 of operation, the magnitude of effect to visual amenity is considered to be **negligible** and the significance of effect **minor/negligible adverse** to **negligible adverse**, which would constitute a **not significant** effect.
Botolph Claydon	High/ medium	**Scenario 1**: The village is partially within the ZTV for Parcel 2 and more substantially for Parcel 3. Views out from the village towards both parcels are partially screened by built form and intervening vegetation with potential visibility primarily limited to upper storey, south and east facing properties. Rosefield Substation would be at least partially screened by intervening topography and vegetation and located in the vicinity of the National Grid East Claydon Substation. However, views of Rosefield Solar Farm would be possible above and between intervening topography and vegetation and therefore the scale of change is considered to be **medium** for a localised extent. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **slight** and the significance of effect **moderate/minor adverse** which would constitute a **not significant** effect. During Year 1 of operation, the magnitude of effect to visual amenity is considered to be **moderate** and the significance of effect **moderate adverse**. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant.** During Year 10 of operation, the proposed mitigation measures would increase tree and hedgerow cover around the periphery of the Site which would filter and

Receptor	Sensitivity	Summary of likely significant effects
		partially screen views of Rosefield Solar Farm and help integrate it into the surrounding landscape. However, at operation Year 10, the magnitude of effect to visual amenity is considered to remain as **moderate** and the significance of effect **moderate adverse**. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. **Scenario 2**: The location of Rosefield Substation to the southern extent of Parcel 3 would bring it closer to the village, albeit potential visibility would still primarily be limited to upper storey, east facing properties. The scale of change is considered to be **large** to **medium** for a limited extent, remaining **medium** over a localised extent. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **slight** and the significance of effect **moderate adverse**. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. During Year 1 of operation, the magnitude of effect to visual amenity is considered to be **moderate** and the significance of effect **major/moderate adverse** to **moderate adverse**, which would constitute a **significant** effect. During Year 10 of operation, the proposed mitigation measures would increase tree and hedgerow cover around the periphery of the Site which would filter and partially screen views of Rosefield Solar Farm and help integrate it into the surrounding landscape. However, views of Rosefield Substation would remain, and the significance of effect would be unchanged as **major/moderate adverse** to **moderate adverse**, which would constitute a **significant** effect.
Granborough	High/ medium	**Scenario 1**: The village is partially within the ZTV for Parcel 2 and Parcel 3, albeit views of Parcel 2 are considerably more distant. Views out from the village towards the Site are partially screened by built form and intervening vegetation with potential visibility primarily limited to properties on the western periphery of the village. Views of Rosefield Substation would be partially filtered/screened by intervening vegetation and located in the vicinity of the National Grid East Claydon

Receptor	Sensitivity	Summary of likely significant effects
		Substation and the scale of change is considered to be **medium** for a localised extent. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **slight** and the significance of effect **moderate/minor adverse**, which would constitute a **not significant** effect. During Year 1 of operation, the magnitude of effect to visual amenity is considered to be **moderate** to **slight** and the significance of effect **moderate adverse**. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. During Year 10 of operation, the proposed mitigation measures would increase tree and hedgerow cover around the periphery of the site which would filter and partially screen views of Rosefield Solar Farm and help integrate it into the surrounding landscape. However, at operation Year 10, the magnitude of effect to visual amenity is considered to remain as **moderate** to **slight** and the significance of effect **moderate adverse**. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. **Scenario 2**: The location of Rosefield Substation to the southern extent of Parcel 3 would increase the viewing distance of 15 m structures potentially visible from the village, albeit separated further from the National Grid East Claydon Substation. The scale of change is considered to remain **medium** for a localised area. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **slight** and the significance of effect **moderate/minor adverse**, which would constitute a **not significant** effect. During Year 1 of operation, the magnitude of effect to visual amenity is considered to be **moderate** to **slight** and the significance of effect **moderate adverse**. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. During Year 10 of operation, the proposed mitigation measures would increase tree and hedgerow cover around the periphery of the site which would filter and

Receptor	Sensitivity	Summary of likely significant effects
		partially screen views of Rosefield Solar Farm and help integrate it into the surrounding landscape. However, views of Rosefield Substation would remain, and the significance of effect would be unchanged as **moderate adverse**.. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**.
North Marston	High/ medium	The village is partially within the ZTV for Parcel 2 and 3, albeit at distances of at least 3 km and 2.5 km from the Site respectively. Views out from the village towards the Site are predominantly screened by built form and intervening vegetation with potential visibility likely limited to upper storey, west facing properties and the scale of change is considered to be **small** for a localised extent. **Scenario 1**: During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **slight** to **negligible** and the significance of effect **minor adverse**, which would constitute a **not significant** effect. During Year 1 and 10 of operation, the magnitude of effect to visual amenity is considered to be **slight** and the significance of effect **moderate/minor adverse**, which would constitute a **not significant** effect. **Scenario 2**: The location of Rosefield Substation to the southern extent of Parcel 3 would potentially reduce its distance from the village. However, views to Rosefield Substation would be at distances of over 2.5 km and the scale of change is considered to be remain **small** for a localised extent. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **slight** to **negligible** and the significance of effect **minor adverse**, which would constitute a **not significant** effect. During Year 1 and 10 of operation, the magnitude of effect to visual amenity is considered to be **slight** and the significance of effect **moderate/minor adverse**, which would constitute a **not significant** effect.
Oving	High/ medium	The village is partially within the ZTV for Parcel 2 and 3, albeit at distances of at least 5 km and 4.5 km respectively. Distant views out from the village towards

Receptor	Sensitivity	Summary of likely significant effects
		the Site are predominantly screened by built form and intervening vegetation with potential visibility limited to properties on its western periphery. Views of Rosefield Substation for Scenarios 1 and 2 would be at distances of greater than 4.5 km and the scale of change is considered to be **small** for a limited extent in the case of both scenarios. **Scenario 1**: During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **negligible** and the significance of effect **minor/negligible adverse**, which would constitute a **not significant** effect. During Year 1 and 10 of operation, the magnitude of effect to visual amenity is considered to be **slight** to **negligible** and the significance of effect **minor adverse**, which would constitute a **not significant** effect. **Scenario 2**: The location of the proposed Rosefield Substation to the southern extent of Parcel 3 would potentially reduce its distance from the village. However, views to Rosefield Substation would be at distances of over 4.5 km and the scale of change is considered to be remain **small** for a limited extent. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **negligible** and the significance of effect **minor/negligible adverse**, which would constitute a **not significant** effect. During Year 1 and 10 of operation, the magnitude of effect to visual amenity is considered to be **slight** to **negligible** and the significance of effect **minor adverse**, which would constitute a **not significant** effect.
Steeple Claydon	High/ medium	The village sits on an elevated ridge and is partially within the ZTV for Parcel 1; it shows a low degree of visibility for Parcel 2 and none for Parcel 3, however any potential views would be screened to the former by intervening layers of vegetation. Views out from the village towards the site are predominantly screened by built form and intervening vegetation with potential visibility limited to properties on the southern periphery at distances beyond 1.5 km. Given potential views of Rosefield Solar Farm above and between intervening vegetation the scale of change is considered to be **medium** to **small** for a localised extent. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be

Receptor	Sensitivity	Summary of likely significant effects
		slight and the significance of effect **moderate/minor adverse**, which would constitute a **not significant** effect. During Year 1 of operation, the magnitude of effect to visual amenity is considered to be **moderate** to **slight** and the significance of effect **moderate adverse**. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. During Year 10 of operation, the proposed mitigation measures would increase tree and hedgerow cover around the periphery of the site which would filter and partially screen views of Rosefield Solar Farm and help integrate it into the surrounding landscape. However, the significance of effect would be unchanged as **moderate adverse**. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**.
Winslow	High/ medium	The village sits on an elevated ridge and is partially within the ZTV for Parcel 3; it shows a low degree of visibility for Parcel 2 and none for Parcel 1. Views to Parcel 2 would be limited by distance and layers of intervening vegetation. Views out from the village towards Parcel 3 are predominantly screened by built form and intervening vegetation with potential visibility limited to properties on its south-western periphery. Given potential views of Rosefield Solar Farm above, and between intervening vegetation, the scale of change is considered to be **small** for a localised extent. As Rosefield Substation would be virtually aligned in views for Scenarios 1 and 2 it is not considered there would be any substantial changes between the two. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **slight** to **negligible** and the significance of effect **minor adverse**, which would constitute a **not significant** effect. During Year 1 of operation, the magnitude of effect to visual amenity is considered to be **slight** and the significance of effect **moderate/minor adverse**, which would constitute a **not significant** effect. During Year 10 of operation, the proposed mitigation measures would increase tree and hedgerow cover

Receptor	Sensitivity	Summary of likely significant effects
		around the periphery of the site which would filter and partially screen views of Rosefield Solar Farm and help integrate it into the surrounding landscape. However, the significance of effect would be unchanged as **moderate/minor adverse**, which would constitute a **not significant** effect.
Visual receptors – Users of main roads		
Orchard Way/Calvert Road	Medium	The road runs broadly east to west through the centre of the Study area from Calvert to Botolph Claydon. Views towards the Site are generally screened by intervening roadside hedgerows; however, there are occasional gaps in the hedgerow, or areas with no hedgerow, with open views possible towards the Site. Overall, the scale of change is considered to be **medium** to **small** over an intermediate extent. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **slight** and the significance of effect **moderate/minor adverse**, which would constitute a **not significant** effect. At operation Year 1, the magnitude of effect to visual amenity is considered to be **moderate** to **slight** and the significance of effect **moderate** to **moderate/minor adverse**. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **not significant**. At operation Year 10 of operation, the proposed mitigation measures would increase tree and hedgerow cover around the periphery of the site which would filter and partially screen views of Rosefield Solar Farm and help integrate it into the surrounding landscape. The significance of effect would reduce to **moderate/minor adverse**, which would constitute a **not significant** effect.
Queen Catherine Road	Medium	The road runs broadly east to west between Steeple Claydon and Middle Claydon at distances over 1 km to the north of Parcel 1. The line of the road is now different to that presented on the OS mapping due to new road and bridge construction over the East West Rail line. Views towards the Site are more pronounced from the higher elevations close to Steeple Claydon with views often screened or filtered by intervening roadside

Receptor	Sensitivity	Summary of likely significant effects
		hedgerows and woodland blocks; however, there are occasional gaps in the hedgerow, or areas with no hedgerow, with views possible towards the Site. Overall, the scale of change is considered to be **small** over an intermediate extent. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **slight** to **negligible** and the significance of effect **minor adverse**, which would constitute a **not significant** effect. At operation Year 1, the magnitude of effect to visual amenity is considered to be **slight** and the significance of effect **moderate/minor adverse**, which would constitute a **not significant** effect. At operation Year 10 of operation, the proposed mitigation measures would increase tree and hedgerow cover around the periphery of the site which would filter and partially screen views of Rosefield Solar Farm and help integrate it into the surrounding landscape. However, the significance of effect would be unchanged as **moderate/minor adverse**, which would constitute a **not significant** effect.
Claydon Road	Medium	The road runs broadly north to south through the centre of the Study area from Botolph Claydon to Hogshaw Farm. Views towards the Site are partially screened by intervening roadside hedgerows; however, there are views above and between hedgerows, with open views possible towards the Site. Overall, the scale of change is considered to be **large** to **medium** over an intermediate extent. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **moderate** to **slight** and the significance of effect **moderate/minor adverse**, which would constitute a **not significant** effect. At operation Year 1, the magnitude of effect to visual amenity is considered to be **substantial** to **moderate** and the significance of effect **moderate adverse**. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. At operation Year 10, the proposed planting around the Site would provide additional screening and integration,

Receptor	Sensitivity	Summary of likely significant effects
		which would reduce the visual impacts on receptors using this road. The magnitude of effect to visual amenity is considered to be **moderate** to **slight** and the significance of effect **moderate/minor adverse**, which would constitute a **not significant** effect
East Claydon Road	Medium	**Scenario 1**: The road runs broadly east to west from Winslow Road to East Claydon. Views towards the Site are generally screened by intervening roadside hedgerows; however, there are filtered views towards the Site. Overall, the scale of change is considered to be **small** over an intermediate extent. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **slight** to **negligible** and the significance of effect **minor adverse**, which would constitute a **not significant effect**. At operation Year 1, the magnitude of effect to visual amenity is considered to be **moderate** to **slight** and the significance of effect **moderate/minor adverse**, which would constitute a **not significant** effect. At operation Year 10, the proposed planting around the Site would partially screen views of Rosefield Solar Farm and help integrate it into the surrounding landscape. However, views of Rosefield Substation would remain, and the significance of effect would be unchanged as **moderate/minor adverse**, which would constitute a **not significant** effect. **Scenario 2**: Views towards Rosefield Solar Farm are generally screened by intervening roadside hedgerows and topography; there would be limited filtered views towards the site. Overall, the scale of change is considered to be **small** over a limited extent. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **negligible** and the significance of effect **minor/negligible adverse**, which would constitute a **not significant** effect. At operation Year 1, the magnitude of effect to visual amenity is considered to be **slight** to **negligible** and the significance of effect **minor adverse**, which would constitute a **not significant** effect. At operation Year 10, the proposed planting around the Site would partially screen views of Rosefield Solar

Receptor	Sensitivity	Summary of likely significant effects
		Farm and help integrate it into the surrounding landscape. The significance of effect would be reduced to **minor/negligible adverse**, which would constitute a **not significant** effect.
Visual receptors – Users of main transport routes		
East West Rail	Low	The route runs broadly east to west through the centre/north of the Study area. Views towards the Site are partially screened intervening vegetation and topography; however, there would be filtered views over a section to the north of the site. Overall, the scale of change is considered to be **small** over a limited extent. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **negligible** and the significance of effect **negligible adverse**, which would constitute a **not significant** effect. At operation Year 1, the magnitude of effect to visual amenity is considered to be **slight** to **negligible** and the significance of effect **minor/negligible adverse**, which would constitute a **not significant** effect. At operation Year 10, the proposed planting around the Site would partially screen views of Rosefield Solar Farm and help integrate it into the surrounding landscape. However, the significance of effect would be unchanged as **minor/negligible adverse**, which would constitute a **not significant** effect.
Visual receptors – Users of recreational routes		
NCN Route No. 51	High/ Medium	The route runs broadly east to west through the centre/north of the Study area. Views towards the Site are predominantly screened by intervening topography and vegetation; however, there would be filtered views over a section of Queen Catherine Road at distances over 1 km to the north of the site. Overall, the scale of change is considered to be **small** over a limited extent. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **negligible** and the significance of effect **minor/negligible adverse**, which would constitute a **not significant** effect. At operation Year 1, the magnitude of effect to visual amenity is considered to be **slight** to **negligible** and the

Receptor	Sensitivity	Summary of likely significant effects
		significance of effect **minor adverse**, which would constitute a **not significant** effect. At operation Year 10 of operation, the proposed mitigation measures would increase tree and hedgerow cover around the periphery of the site which would filter and partially screen views of Rosefield Solar Farm and help integrate it into the surrounding landscape. However, the significance of effect would be unchanged as **minor adverse**, which would constitute a **not significant** effect.
Bernwood Jubilee Way	High/ Medium	**Scenario 1**: The route runs in an arc broadly north to south through the Study area. Views towards the Site are generally screened by intervening topography and vegetation. However, there are potentially open views from within the section of Parcel 2 that extends to the south of Botolph Claydon. Overall, the scale of change is considered to be **large** over a localised extent. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **moderate** to **slight** and the significance of effect to **moderate adverse**. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. At operation Year 1, the magnitude of effect to visual amenity is considered to be **substantial** to **moderate** and the significance of effect **major/ moderate adverse**, which would constitute a **significant** effect. At operation Year 10, the proposed planting around the Site would partially screen views of Rosefield Solar Farm and help integrate it into the surrounding landscape. However, views of the Solar PV modules would remain within panoramic views, and the significance of effect would remain unchanged as **major/moderate adverse**, which would constitute a **significant** effect. **Scenario 2**: Views towards Rosefield Substation extend into more open countryside, albeit at some distance from the viewer. Overall, the scale of change is considered to remain **large** over a localised extent, and hence effects would remain as Scenario 1. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be

Receptor	Sensitivity	Summary of likely significant effects
		moderate to **slight** and the significance of effect to **moderate adverse**. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. At operation Year 1, the magnitude of effect to visual amenity is considered to be **substantial** to **moderate** and the significance of effect **major/ moderate adverse**, which would constitute a **significant** effect. At operation Year 10, the proposed planting around the Site would partially screen views of Rosefield Solar Farm and help integrate it into the surrounding landscape. However, views of the Solar PV modules would remain within panoramic views, and the significance of effect would remain unchanged as **major/moderate adverse**, which would constitute a **significant** effect.
North Buckinghamshire Way/ Matthew's Way and Midshires Way	High/ Medium	**Scenario 1**: The North Buckinghamshire Way/Matthew's Way and Midshires Way run broadly north to south through the Study area. Views towards the Site are generally screened by intervening topography and vegetation. However, there are potentially open views from within the southernmost fields of Parcel 3 and more distant views of Parcel 2 from within the vale to the east of Botolph Claydon. Further open views of both Parcels 2 and 3 extend to the elevated land of Conduit Hill, Quainton Hill and Simber Hill. Overall, the scale of change is considered to be **large** to **medium** over a localised extent. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **moderate** to **slight** and the significance of effect **moderate adverse**. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. At operation Year 1, the magnitude of effect to visual amenity is considered to be **moderate** and the significance of effect **major/moderate adverse** to **moderate adverse**, which would constitute a **significant** effect. At operation Year 10, the proposed planting around the Site would partially screen views of Rosefield Solar Farm and help integrate it into the surrounding

Receptor	Sensitivity	Summary of likely significant effects
		landscape. However, views of the Solar PV modules would remain within panoramic views, and the significance of effect would be unchanged as **major/moderate adverse** to **moderate adverse**, which would constitute a **significant** effect. **Scenario 2**: The scale of views would increase to **large** for a localised extent of views as the route passes directly adjacent to the Rosefield Substation to the east of Botolph Claydon. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **moderate** to **slight** and the significance of effect **moderate adverse**. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. At operation Year 1, the magnitude of effect to visual amenity is considered to be **substantial** to **moderate** and the significance of effect **major/ moderate adverse**, which would constitute a **significant** effect. At operation Year 10, the proposed planting around the Site would partially screen views of Rosefield Solar Farm and help integrate it into the surrounding landscape. However, near views of the Rosefield Substation and wider panoramic views of Solar PV modules would remain, and the significance of effect would be unchanged as **major/moderate adverse**, which would constitute a **significant** effect.
The Swan's Way/Outer Aylesbury Ring	High/ Medium	**Scenario 1**: The Swan's Way and Outer Aylesbury Ring run broadly north to south through the Study area within the ZTV. Views towards the Site are predominantly experienced as somewhat distant open views to Parcels 2 and 3 from the elevated land of Conduit Hill and Quainton Hill. Overall, the scale of change is considered to be **large** to **medium** over a limited extent. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **moderate/slight** and the significance of effect **moderate adverse**. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**.

Receptor	Sensitivity	Summary of likely significant effects
		At operation Year 1, the magnitude of effect to visual amenity is considered to be **moderate** and the significance of effect **major/moderate adverse** to **moderate adverse**, which would constitute a **significant** effect. At operation Year 10, the proposed planting around the Site would partially screen views of Rosefield Solar Farm and help integrate it into the surrounding landscape. However, views of the Solar PV modules would remain within panoramic views, and the significance of effect would be unchanged as **major/moderate adverse** to **moderate adverse** which would constitute a **significant** effect. **Scenario 2**: Rosefield Substation would be positioned further into open countryside and somewhat closer in view. Overall, the scale of change is considered to remain **large** to **medium** over a limited extent, and hence effects would remain as Scenario 1.
SCL/7/1 SCL/7/2 SCL/8/1 SCL/8/2 SCL/8/3 SCL/8/4 SCL/9/1 SCL/9/3 SCL/7/1 MCL/10/1 MCL/10/2 Addison Road	High/ Medium	These routes extend north to south from Steeple Claydon towards the northern boundary of Parcel 1 and Calvert Road. As illustrated by the ZTV for Parcel 1, the degree of visibility varies depending on the extent of intervening landform and vegetation. Given potential views of Rosefield Solar Farm above and between intervening landform and vegetation the scale of change is considered **medium** to **small** for an intermediate extent. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **slight** and the significance of effect **moderate/minor adverse**, which would constitute a **not significant** effect. During Year 1 of operation, the magnitude of effect to visual amenity is considered to be **moderate** to **slight** and the significance of effect **moderate adverse**. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. At operation Year 10, the proposed planting around the Site would partially screen/filter views of Rosefield Solar Farm and help integrate it into the surrounding landscape. However, views of the Solar PV modules would remain as **moderate**. Noting that moderate effects may or may not be significant, it is the

Receptor	Sensitivity	Summary of likely significant effects
		professional opinion of the assessors that in this instance, the effect would be **significant**.
SCL/12/1 SCL/12/2 SCL/13/1 SCL/13/2	High/ Medium	These routes extend within the western and southern extents of Parcel 1, in Fields B1 and B4 to B7. There would be a high degree of visibility of Solar PV modules in close proximity to walkers along these routes and the scale of change is considered **large** for a wide extent of the route. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **moderate** and the significance of effect **major/moderate adverse** to **moderate adverse**, which would constitute a **significant** effect. During operation Year 1, the magnitude of effect to visual amenity is considered to be **substantial** and the significance of effect **major adverse** to **major/moderate adverse**, which would constitute a **significant** effect. At operation Year 10, the proposed planting around the Site would provide additional screening and integration, which would reduce the visual impacts on receptors using these routes. The magnitude of effect to visual amenity is considered to be **substantial** to **moderate** and the significance of effect **major/moderate adverse**, which would constitute a **significant** effect.
MCL/17/1 MCL/18/1 MCL/18/2 MCL/20/2	High/ Medium	These routes are located to the east of Knowlhill Farm in closest proximity to Field B18 in Parcel 1. Views towards the Site are partially screened by intervening hedgerows and built form. However, there are views above the hedgerow and areas with no buildings, enabling views of land as it begins to rise towards Knowl Hill. Overall, the scale of change is considered to be **medium** to **small** over a localised extent of the route. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **slight** and the significance of effect **moderate/minor adverse**, which would constitute a **not significant** effect. During operation Year 1, the magnitude of effect to visual amenity is considered to be **moderate** to **slight** and the significance of effect **moderate adverse**. Noting that moderate effects may or may not be significant, it is

Receptor	Sensitivity	Summary of likely significant effects
		the professional opinion of the assessors that in this instance, the effect would be **not significant**. During operation Year 10, the proposed hedgerow management would provide additional screening and integration, which would reduce the visual impacts on receptors using this route. The magnitude of effect to visual amenity is considered to be **slight** and the significance of effect **moderate/minor adverse**, which would constitute a **not significant** effect.
MCL/15/1 ECL/9/1	High/ Medium	These public rights of way are representative of routes that lie between Parcels 1 and 2. Views towards the Site are predominantly screened by intervening hedgerows and hedgerow trees. However, there are views above the hedgerow and topography towards Fields D3 and D12 of Parcel 2 for walkers travelling east towards Botolph Claydon. Overall, the scale of change is considered to be **small** over a localised extent of the route. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **slight** to **negligible** and the significance of effect **minor adverse**, which would constitute a **not significant effect**. During operation Year 1, the magnitude of effect to visual amenity is considered to be **slight** and the significance of effect **moderate/minor adverse**, which would constitute a **not significant** effect. During operation Year 10, the proposed hedgerow management would provide additional screening and integration, which would reduce the visual impacts on receptors using these routes. However, the significance of effect would be unchanged as **moderate/minor adverse**, which would constitute a **not significant** effect.
ECL/7/1 ECL/7/2, ECL/8/1, ECL/9/2, ECL/10/1, ECL/10/2 to ECL/10/5	High/ Medium	These routes extend south from Botolph Claydon to within the northern extent of Parcel 2. Solar PV modules have been set back from the route of the Bernwood Jubilee Way (ECL/8/1) to retain panoramic views to the Claydon Vale and Quainton Hill. However, there would be a high degree of visibility for walkers where adjacent to solar panels and the scale of change is considered **large** for a wide extent of the route where this is the case.

Receptor	Sensitivity	Summary of likely significant effects
		Scenario 1: During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **moderate** and the significance of effect **major/moderate adverse** to **moderate adverse**, which would constitute a **significant** effect. During operation Year 1, the magnitude of effect to visual amenity is considered to be **substantial** and the significance of effect **major adverse** to **major/moderate adverse**, which would constitute a **significant** effect. At operation Year 10, the proposed planting around the site would provide some additional screening and integration, which would reduce the visual impacts on receptors using these routes. The magnitude of effect to visual amenity is considered to reduce for the majority of routes to **substantial/moderate** and the significance of effect to **major/moderate adverse**, which would constitute a **significant** effect. Significance of effects would remain as **major adverse** to **major/moderate adverse** for ECL/8/1, which would constitute a **significant** effect. **Scenario 2**: Although the taller structures in Parcel 3 would be visible from these routes, the extent of views in comparison to Parcel 1 would not be substantially alter the scale of views, hence Scenario 2 effects would be as per Scenario 1.
ECL/8/2, QUA/38/1 QUA/40/3 QUA41/1 QUA/42/2 MCL/22/1	High/ Medium	These routes continue further south into Parcel 2 through and around Fields D28 and D29. There would be a high degree of visibility of solar panels in close proximity to walkers along these routes and the scale of change is considered **large** to **medium** for a wide extent of the route. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **moderate** and the significance of effect **major/moderate adverse** to **moderate adverse**, which would constitute a **significant** effect. During operation Year 1, the magnitude of effect to visual amenity is considered to be **substantial** and the significance of effect **major adverse** to **major/moderate adverse**, which would constitute a **significant** effect. At operation Year 10, the proposed planting around the site would provide additional screening and integration, which would reduce the visual impacts on receptors

Receptor	Sensitivity	Summary of likely significant effects
		using these routes. The magnitude of effect to visual amenity is considered to be **substantial** to **moderate** and the significance of effect **major/moderate adverse**, which would constitute a **significant** effect.
QUA/38/2 QUA/39/1 QUA/40/1 QUA/40/3 QUA/42/1 GUN/34/1	High/ Medium	The routes extend from the southern and western boundaries of Parcel 2 to lower lying ground to the south. Views towards the Site are predominantly screened by intervening topography and vegetation, with very limited potential views of Solar PV modules above and between hedgerows. Overall, the scale of change is considered to be **small** to **negligible** over a localised extent of the route. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **negligible** and the significance of effect **minor/negligible adverse**, which would constitute a **not significant** effect. During operation Year 1, the magnitude of effect to visual amenity is considered to be **slight to negligible** and the significance of effect **minor adverse**, which would constitute a **not significant** effect. During operation Year 10, the proposed planting around the Site would provide additional screening and integration, which would reduce the visual impacts on receptors using this route. However, the magnitude of effect to visual amenity is considered to remain **slight** to **negligible** and the significance of effect **minor adverse**, which would constitute a **not significant** effect
ECL/3/1 ECL/3A/1 ECL/3/2 ECL/4/1 ECL/4/2 ECL/5/1 ECL/6/1 HOG/6/1 Granborough Road	High/ Medium	These routes extend generally south and east from East Claydon to within Parcel 3. The routes are partially within the ZTV for Parcel 2 and more substantially for Parcel 3, with often open views of Fields E11 and E21 to E23. The extent of visibility varies from within each route, in places screened and partially screened by topography and vegetation, but with substantial sections of each route with direct and open views of each element of Rosefield Solar Farm. **Scenario 1**: Rosefield Substation would be visible in open views to Field E11 located in the vicinity of existing National Grid East Claydon Substation. Views of the BESS and main Collector Compound would be experienced in open views of Fields E22 and E23. Views to Parcel 2 would be more distant and generally limited

Receptor	Sensitivity	Summary of likely significant effects
		to Fields D14-D19. In each case these views would be in the context of a number of steel pylons and overhead lines and the National Grid East Claydon Substation. The scale of change is considered to be **large** to **medium** for a wide to intermediate extent. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **moderate** and the significance of effect **major/moderate adverse** to **moderate adverse**, which would constitute a **significant** effect. During Year 1 of operation, the magnitude of effect to visual amenity is considered to be **substantial** to **moderate** and the significance of effect **major/moderate adverse**, which would constitute a **significant** effect. During Year 10 of operation, the proposed mitigation measures would increase tree and hedgerow cover around the periphery of the Site which would partially screen views of Rosefield Solar Farm and help integrate it into the surrounding landscape. The magnitude of effect to visual amenity is considered to reduce to **moderate** and the significance of effect **major/moderate adverse** to **moderate adverse**, which would constitute a **significant** effect. **Scenario 2**: The location of Rosefield Substation to within Field E23 would increase in scale to within more open countryside from the majority of these routes. The scale of change is considered to be **large** for a wide to intermediate extent. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **moderate** and the significance of effect **major/moderate adverse** to **moderate adverse**, which would constitute a **significant** effect. During Year 1 of operation, the magnitude of effect to visual amenity is considered to be **substantial** and the significance of effect **major adverse** to **major/moderate adverse**, which would constitute a **significant** effect. During Year 10 of operation, the proposed mitigation measures would increase tree and hedgerow cover around the periphery of the Site which would partially screen views of Rosefield Solar Farm and help integrate it into the surrounding landscape. However, views of Rosefield Solar Farm would remain, and the significance

Receptor	Sensitivity	Summary of likely significant effects
		of effect would stay **major adverse** to **major/moderate adverse**, which would constitute a **significant** effect.
ECL/11/1 ECL/11/2 ECL/11/3 ECL/11/4	High/ Medium	These routes extend from Botolph Claydon to East Claydon following the route of Botyl Road then forking off-road close to property Ivy Nook. The route is partially within the ZTV for Parcel 2, however, these views are effectively screened by field boundary vegetation and views are limited to those of Parcel 3 through two field gate openings along ECL/11/1. **Scenario 1**: There would be views of the taller structures in Parcel 3; Rosefield Substation would be viewed in context of the National Grid East Claydon Substation and a number of steel pylons and overhead lines. The scale of change is considered to be **large** to **medium** for a limited extent. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **slight** and the significance of effect **moderate/minor adverse**, which would constitute a **not significant** effect. During Year 1 of operation, the magnitude of effect to visual amenity is considered to be **moderate** and the significance of effect **moderate adverse**. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. During Year 10 of operation, the proposed mitigation measures would increase tree and hedgerow cover around the periphery of the Site which would partially screen views of Rosefield Solar Farm and help integrate it into the surrounding landscape and therefore reduce impacts on visual amenity. At operation Year 10, the magnitude of effect to visual amenity is considered to be **moderate** to **slight** and the significance of effect **moderate adverse**. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. **Scenario 2**: The location of Rosefield Substation to the southern extent of Parcel 3 would increase the scale of change within view. The scale of change is considered to be **large** for a limited extent.

Receptor	Sensitivity	Summary of likely significant effects
		During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **moderate** to **slight** and the significance of effect **moderate adverse**. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. During Year 1 of operation, the magnitude of effect to visual amenity is considered to be **moderate** and the significance of effect **major/moderate adverse** to **moderate adverse**, which would constitute a **significant** effect. During Year 10 of operation, the proposed mitigation measures would increase tree and hedgerow cover around the periphery of the Site which would partially screen views of Rosefield Solar Farm and help integrate it into the surrounding landscape. However, views of Rosefield Substation would remain, and the significance of effect would be unchanged as **major/moderate adverse** to **moderate adverse**, which would constitute a **significant** effect.
GRA1/1 GRA/1/2 GRA/2/1 GRA/2/2 GRA/3/1 GRA/3/2 GRA/4/1 GRA/10/1 GRA/11/1 WIS/1/2		These routes extend from the eastern boundary of Parcel 3 lying within the ZTV for Parcels 2 and 3 and increasing in extent of view from their more elevated sections towards Granborough. **Scenario 1**: Rosefield Substation would be visible in Field E11 located in the vicinity of the existing National Grid East Claydon Substation with views of the BESS and main collector compound to the south. Views to Parcel 2 would be more distant and generally limited to Fields D14-D19. All views would be in the context of a number of steel pylons and overhead lines and the National Grid East Claydon Substation. The scale of change is considered to be **medium** for a localised extent. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **slight** and the significance of effect **moderate/minor adverse**, which would constitute a **not significant** effect. During Year 1 of operation, the magnitude of effect to visual amenity is considered to be **moderate** to **slight** and the significance of effect **moderate adverse**. Noting that moderate effects may or may not be significant, it is

Receptor	Sensitivity	Summary of likely significant effects
		the professional opinion of the assessors that in this instance, the effect would be **significant**. During Year 10 of operation, the proposed mitigation measures would increase tree and hedgerow cover around the periphery of the Site which would filter views of Rosefield Solar Farm and help integrate it into the surrounding landscape. However, the significance of effect is considered to remain **moderate adverse**. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. **Scenario 2**: Views of Rosefield Substation would be increased in scale and would appear somewhat disconnected from the National Grid East Claydon Substation. The scale of change is considered to be **large** to **medium** for an intermediate to localised extent. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **moderate** to **slight** and the significance of effect **moderate adverse** . Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. During Year 1 of operation, the magnitude of effect to visual amenity is considered to be **substantial** to **moderate** and the significance of effect **major/moderate adverse**, which would constitute a **significant** effect. During Year 10 of operation, the proposed mitigation measures would increase tree and hedgerow cover around the periphery of the Site which would filter views of Rosefield Solar Farm and help integrate it into the surrounding landscape. However, the significance of effect is considered to remain **major/moderate adverse**, which would constitute a **significant** effect.
HOG/1/1 HOG/8/1 HOG/8/2 HOG/9/2 HOG/9/3 QUA/2/1 QUA/2/2 QUA/9/1	High/ Medium	These routes make up the public right of way that overlap with and have been assessed as part of the long distance ways above.

Receptor	Sensitivity	Summary of likely significant effects
Visual receptors – Users of other recreational receptors		
Claydon House	High/ Medium	Views from within the grounds of the property and from the bridleway which runs north south through the parkland would be limited to Parcel 1 of Rosefield Solar Farm. These views are limited to partial fields above and between intervening vegetation at distances of over 1 km. As illustrated by the ZTV views of the Site are experienced primarily to the south of the main house and it is noted that the more elevated land that makes up Knowl Hill would remain development free. The scale of change is considered **medium** to **small** for an intermediate extent of the route. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **slight** and the significance of effect **moderate/minor adverse**, which would constitute a **not significant** effect. During operation Year 1, the magnitude of effect to visual amenity is considered to be **moderate** to **slight** and the significance of effect **moderate adverse**. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. At operation Year 10, the proposed planting and hedgerow management around the Site would provide some additional screening and integration. However, the magnitude of effect to visual amenity is considered to remain **moderate/slight** and the significance of effect **moderate adverse**. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**.
Hogshaw Farm and Wildlife Park and HOG/7/1	High/ Medium	Views from within the grounds of the visitor centre and footpath which runs north south through the farm would be limited to the northern section of Parcel 2, with some potential open views of Solar PV modules on land as it rises towards Botolph Claydon above and between intervening vegetation. The scale of change is considered **large** to **medium** over an intermediate extent of the attraction. During construction and decommissioning, the magnitude of effect to visual amenity is considered to be **moderate** to **slight** and the significance of effect

Receptor	Sensitivity	Summary of likely significant effects
		moderate adverse. Noting that moderate effects may or may not be significant, it is the professional opinion of the assessors that in this instance, the effect would be **significant**. During operation Year 1, the magnitude of effect to visual amenity is considered to be **substantial** to **moderate** and the significance of effect **major/moderate adverse**, which would constitute a **significant** effect. At operation Year 10, the proposed planting and hedgerow management around the Site would provide some additional screening and integration, which would reduce the visual impacts on receptors. However, the magnitude of effect to visual amenity would remain as **substantial** to **moderate** and the significance of effect **major/moderate adverse**, which would constitute a **significant** effect.

11.13. Opportunities for enhancement

11.13.1. As the design of Rosefield Solar Farm evolves, localised opportunities for landscape enhancement are expected to be identified and embedded into the design for the DCO application, with the principles of the management of such enhancement outlined in the Outline Landscape and Ecological Management Plan which will be submitted in support of the DCO application. The following enhancement opportunities have currently been identified in relation to landscape and visual and are illustrated in **Figure 3.4** in **Volume 2**:

- As well as providing visual mitigation, proposed tree and hedgerow planting may enhance the existing landscape fabric and character and contribute to the 'landscape condition/quality' aspect of landscape value;
- Permissive footpaths may be proposed where they would provide improved access by way of connecting disjointed areas of the network of public rights of way, reduce the need to walk along roads, or provide improved options for circular walks. These access improvements may contribute to the 'amenity and recreation' aspect of landscape value;
- Interpretation may be provided at points of interest along the public rights of way network and permissive routes within the Site. These may identify information of local landscape, biodiversity and heritage interest. In addition, some interpretation may describe aspects of Rosefield Solar Farm itself, primarily in areas where Rosefield Solar Farm would be more openly visible. This interpretation may contribute

to the ‘cultural heritage’ and/or ‘cultural associations’ aspects of landscape value;

- Measures may be taken to improve access and wayfinding within Rosefield Solar Farm that would include mapped and waymarked routes and improvements to stiles, gates and bridges and parking areas as required. These access improvements may contribute to the ‘amenity and recreation’ aspect of landscape value; and
- Biodiversity enhancements may contribute to the ‘natural heritage’ aspect of landscape value.

11.14. Difficulties and uncertainties

11.14.1. The following difficulties and uncertainties have been encountered in undertaking this preliminary assessment:

- The information provided in this PEIR is preliminary and is based on the information available at the time of writing. A full assessment of likely significant effects will be reported in the ES; and
- At the time of writing this assessment, initial consultation has been received from Buckinghamshire Council with respect to the Landscape and Visual Impact Assessment Study area and some advice on viewpoint selection. However, a full list of viewpoints has yet to be agreed and the Applicant will continue to seek to consult with Buckinghamshire Council to clarify this matter.

11.15. Further work required to inform the ES

11.15.1. This chapter provides preliminary landscape and visual information based on design of Rosefield Solar Farm to date and the data gathered at this point in time. Some of the information gathered will be supplemented and provided in full and final form within the ES.

11.15.2. For the design of Rosefield Solar Farm that informs the ES, careful locating of the various components of Rosefield Solar Farm will continue to take in to account the potential landscape and visual effects of Rosefield Solar Farm. It is proposed that removal or disruption to any existing landscape fabric (i.e. trees, hedgerows) would be minimised to that which is absolutely necessary for the construction of Rosefield Solar Farm. An Outline Landscape and Ecological Management Plan will be submitted in support of the DCO application.

11.15.3. The Applicant will continue to consider feedback from consultation and to consult with Buckinghamshire Council, through which it is hoped to agree all aspects of the Landscape and Visual Impact Assessment to be presented in the ES.

11.15.4. A full Landscape and Visual Impact Assessment will be presented in the ES.

12. Noise and Vibration

12.1. Introduction

12.1.1. This chapter presents a preliminary assessment of the likely significant effects arising from the construction, operation (including maintenance) and decommissioning of Rosefield Solar Farm upon noise and vibration and should be read in conjunction with the following figures and appendices in **Volume 2** and **Volume 3** respectively:

- **Figure 12.1: Study area for noise;**
- **Figure 12.2: Baseline noise monitoring locations;**
- **Figure 12.3: Noise contour map – Scenario 1 unmitigated;**
- **Figure 12.4: Noise contour map – Scenario 2 unmitigated;**
- **Figure 12.5: Noise contour map – Scenario 1 mitigated;**
- **Figure 12.6: Noise contour map – Scenario 2 mitigated;**
- **Appendix 12.1: Glossary of acoustic terminology;**
- **Appendix 12.2: Full list of noise-sensitive receptors assessed;** and
- **Appendix 12.3: Baseline noise survey report.**

12.2. Stakeholder engagement

12.2.1. **Table 12.1** provides a summary of the engagement undertaken to date to inform this preliminary assessment.

Table 12.1 – Engagement undertaken to date

Stakeholder	Date and method	Key matters discussed
Buckinghamshire Council	Email sent (dated 9 November 2023)	Discussed the proposed scope of the baseline noise survey, including monitoring locations and length of survey. Response received from Buckinghamshire Council (dated 29 November 2023), stating acceptance of the monitoring approach.
	Email sent (dated 10 June 2024)	The Applicant provided a copy of the baseline noise report to

Stakeholder	Date and method	Key matters discussed
		review results of the baseline noise monitoring. Awaiting response at the time of writing.

12.2.2. It is anticipated that further consultation will be required with Buckinghamshire Council to seek agreement on appropriate acoustic design targets at sensitive receptors during the construction and operational (including maintenance) phases.

12.3. Legislative framework, planning policy and guidance

12.3.1. The preliminary assessment has been undertaken with regard to the following legislation, planning policy and guidance.

Legislation

- The Control of Pollution Act 1974[1]; and
- The Environmental Pollution Act 1990[2].

National planning policy

- Overarching National Policy Statement for Energy (NPS EN-1) (2023)[3] – Section 5.12 that discusses noise and vibration;
- National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (2023)[4] – Section 2.10 that discusses noise and vibration arising from solar photovoltaic generation schemes;

[1] The Control of Pollution Act 1974. Available online: https://www.legislation.gov.uk/ukpga/1974/40
[2] The Environmental Pollution Act 1990. Available online: https://www.legislation.gov.uk/ukpga/1990/43/contents
[3] Department for Energy Security and Net Zero (2023). Overarching National Policy Statement for Energy (EN-1). Available online: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1
[4] Department for Energy Security and Net Zero (2023). National Policy Statement for Renewable Energy Infrastructure (EN-3). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3

- National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (2023)[5] which mentions issues relating to underground cables, in connection with noise and vibration, although predominantly dealing with high voltage overhead cables;
- National Planning Policy Framework (NPPF) (2023)[6] with reference to Section 15 'Conserving and enhancing the natural environment', specifically paragraphs 180, 191 and 217; and
- Noise Policy Statement for England 2010[7].

Local planning policy

- Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021)[8], specifically Policy BE3 'Protection of the amenity of residents', Policy NE4 'Landscape character and locally important landscape', Policy NE5 'Pollution, air quality and contaminated land', and Policy C3 'Renewable Energy'.

Guidance

- BS 4142:2014+A1:2019 'Methods for Rating and Assessing Industrial and Commercial Sound'[9];
- BS 4142:2014+A1:2019 – Technical Note (Association of Noise Consultants (ANC), 2020)[10];

[5] Department for Energy Security and Net Zero (2023). National Policy Statement for Electricity Networks Infrastructure (EN-5). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5

[6] Ministry of Housing, Communities and Local Government and Department for Levelling Up, Housing and Communities. (2023). Planning Policy Framework. Available online: https://www.gov.uk/government/publications/national-planning-policy-framework--2

[7] Department for Environment, Food and Rural Affairs (2010). Noise Policy Statement for England. Available online: https://www.gov.uk/government/publications/noise-policy-statement-for-england

[8] Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021). Available online: [redacted]

[9] British Standards Institution (2019). British Standard 4142:2014+A1:2019, Methods for rating and assessing industrial and commercial sound. London: British Standard Institution.

[10] BS 4142:2014+A1:2019 – Technical Note (Association of Noise Consultants (ANC), 2020). Available online: [redacted]

- BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise[11];
- BS 5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Vibration[11];
- BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings[12];
- BS 7445-1:2003 Guide to Quantities and Procedures[13];
- BS EN 60942:2018 Electroacoustics – Sound Calibrators[14];
- BS EN 61672-1:2013 Electroacoustics – Sound Level Meters[15];
- Calculation of Road Traffic Noise Memorandum (Department for Transport, 1988)[16];
- Design Manual for Roads and Bridges (DMRB) LA 111 Noise and Vibration (Standards for Highways, 2020)[17];
- Planning Practice Guidance – Noise 2019[18];
- Guidelines for Environmental Noise Impact Assessment (IEMA, 2014)[19];
- ISO 9613-2:1996 Acoustics. Attenuation of Sound During Propagation Outdoors. Part 2: General Method of Calculation[20];

[11] British Standards Institution (2014). British Standard 5228:2009+A1:2014, Code of practice for noise and vibration control on construction and open sites (Part 1: Noise and Part 2: Vibration). London: British Standards Institution.
[12] British Standards Institution (2014). British Standard 8233, Guidance on sound insulation and noise reduction for buildings. London: British Standards Institution.
[13] British Standards Institution (2003). British Standard 7445-1:2003, Description and measurement of environmental noise – Part 1: Guide to quantities and procedures. British Standards Institution, 2003.
[14] British Standards Institution (2018). British Standard IEC 60942:2018 'Electroacoustics, Sound calibrators'.
[15] British Standards Institution (2013). British Standard 61672-1:2013 'Electroacoustics. Sound level meters. Specifications'.
[16] Calculation of Road Traffic Noise Memorandum (Department for Transport, 1988).
[17] Standards for Highways (2020). DMRB LA 111 - Noise and Vibration. Available online: [redacted]
[18] Department for Communities and Local Government (2019). Planning Practice Guidance – Noise. Available online: https://www.gov.uk/guidance/noise--2
[19] Institute of Environmental Management and Assessment (2014). Guidelines for Environmental Noise Impact Assessment. Available online: [redacted]
[20] ISO 9613-2:1996 Acoustics. Attenuation of Sound During Propagation Outdoors. Part 2: General Method of Calculation.

- Guidelines for Community Noise (World Health Organisation, 1999)[21]; and
- Night Noise Guidelines for Europe (World Health Organisation, 2009)[22].

12.4. Study area

12.4.1. The noise and vibration Study area for the assessment of the construction and decommissioning phases of Rosefield Solar Farm considers noise and vibration sensitive receptors that are located within 300 m of the Site boundary. This has been determined based on the guidance set out in BS 5228-1, BS 5228-2 and other related guidance documents, including DMRB LA 111. The Study area is shown in **Figure 12.1** in **Volume 2**.

12.4.2. For the assessment of noise levels during the operational phase (including maintenance) of the Rosefield Solar Farm, the Study area extends out to the nearest or most exposed noise-sensitive receptors to the noise-producing elements of Rosefield Solar Farm as shown in **Figures 12.1 and 12.2** in **Volume 2**.

12.5. Establishing baseline conditions

Baseline noise survey

Measurement details

12.5.1. A baseline noise survey has been undertaken to establish the prevailing acoustic environment at the nearest, or most exposed, noise-sensitive receptors surrounding the Site. The results of the baseline noise survey have been used to inform the acoustic criteria for the construction, operational (including maintenance) and decommissioning phases of Rosefield Solar Farm.

12.5.2. Monitoring positions were determined through a desktop review of both aerial photography and mapping, in addition to the Rosefield Solar Farm plans.

12.5.3. The baseline noise survey comprised unattended noise monitoring at 10 monitoring positions as agreed with Buckinghamshire Council and defined in **Table 12.2** below and presented in **Figure 12.2** in **Volume 2**. The

[21] World Health Organization (1999). Guidelines for community noise. Geneva, Switzerland: World Health Organization. Available online: [redacted]

[22] World Health Organisation (2009). Night Noise Guidelines for Europe. Geneva, Switzerland: World Health Organization. Available online: [redacted]

baseline noise surveys were undertaken between Wednesday 06 March 2024 and Thursday 04 April 2024.

Table 12.2 – Baseline noise measurement locations

ID	Receptor	Location		Measurement dates
		Easting	Northing	
MP1(1)	Sion Hill Farm	475943	226058	06/03/24 – 20/03/24
MP2	Bernwood Farm	473413	224475	25/03/24 – 04/04/24
MP3	Borshaw Farm	473735	223234	06/03/24 – 14/03/24
MP4	Dry Leys Farm	473091	221837	06/03/24 – 18/03/24
MP5	Finmere Hill House	471608	222451	06/03/24 – 20/03/24
MP6	Knowlhill Farm	470837	223635	06/03/24 – 20/03/24
MP7	Catherine Cottages	471005	224855	06/03/24 – 20/03/24
MP8	Pond Farm	469982	224828	20/03/24 – 04/04/24
MP9	Dwelling on Brickhill Way	468907	224367	06/03/24 – 20/03/24
MP10	Muxwell Farm	471694	223911	25/03/24 – 04/04/24

Notes:

1. Proxy location adopted for Sion Hill Farm due to access constraints.

Equipment

12.5.4. The baseline noise survey was undertaken using the equipment detailed in **Table 12.3**.

Table 12.3 – Baseline noise survey equipment

Equipment	Type	Serial number	Calibration date
Sound level meter	Rion NL-52	197783	24/01/2023
Sound level meter	Rion NL-52	976245	21/12/2023
Sound level meter	Rion NL-52	976247	25/08/2023
Sound level meter	Rion NL-52	142653	25/08/2022

Equipment	Type	Serial number	Calibration date
Sound level meter	Rion NL-52	1265456	26/09/2023
Sound level meter	Rion NL-52	1276553	01/02/2023
Sound level meter	Rion NL-52	876025	25/01/2024
Sound level meter	Fusion	14598	30/05/2022
Acoustic Calibrator	Rion NC-74	34615260	03/05/2023
Acoustic Calibrator	Rion NC-74	34167506	14/08/2023

12.5.5. The sound level meters used conform to the Class 1 requirements of BS EN 61672-1:2013 'Electroacoustics. Sound level meter, Specifications'. The calibrator used conforms to the Class 1 requirements of BS EN IEC 60942:2018 'Electroacoustics, Sound calibrators'.

12.5.6. The equipment used has a calibration history that is traceable to a certified calibration institution. The calibration of the sound level meters was checked before and after the measurements, with no significant calibration drift noted i.e. within a +/- 0.5 dB tolerance.

12.5.7. The noise monitoring equipment at all monitoring positions was located at least 3.5 m from any prominent vertical reflective surfaces. All measurements were taken with the microphone situated approximately 1.5 m above ground level.

12.6. Environmental baseline

Noise survey results

12.6.1. **Table 12.4** presents the results of the baseline noise survey undertaken at representative positions, indicative of the nearest, or most exposed, receptors surrounding Rosefield Solar Farm. **Table 12.4** also provides the representative background sound level (dB $L_{A90,T}$) for the daytime and night-time periods following a statistical analysis undertaken in accordance with BS 4142. Further information regarding the baseline survey methodology is provided in **Appendix 12.2** in **Volume 3**.

12.6.2. The data is presented for both daytime (07:00 – 23:00 hours) and night-time (23:00 – 07:00 hours) periods.

12.6.3. Weather information throughout the duration of the noise survey was obtained via two Davis Vantage Pro 2 weather stations installed in the vicinity of monitoring locations MP4 and MP7. Where the weather conditions are considered outside of the parameters for environmental noise monitoring (in accordance with the requirements of BS 7445-1:2003), the corresponding noise data has been omitted from the resultant analysis.

Table 12.4 – Measured noise levels

ID	Period	Average measured noise levels, dB		Representative background sound level dB $L_{A90,T}$
		$L_{Aeq,T}$	$L_{A90,T}$	
MP1	Daytime	43	35	32
	Night-time	38	30	30
MP2	Daytime	49	37	34
	Night-time	51	31	30
MP3	Daytime	46	36	29
	Night-time	40	29	24
MP4	Daytime	57	43	36
	Night-time	49	35	29
MP5	Daytime	48	38	33
	Night-time	46	33	29
MP6	Daytime	47	38	32
	Night-time	41	34	30
MP7	Daytime	45	35	31
	Night-time	41	29	23
MP8	Daytime	46	36	29
	Night-time	46	31	25
MP9	Daytime	49	40	34
	Night-time	41	34	30
MP10	Daytime	48	40	29
	Night-time	44	34	27

Sensitive receptors

12.6.4. Noise-sensitive receptors considered within this preliminary assessment are summarised in **Table 12.5**. In certain instances, the identified noise-sensitive receptors represent a number of dwellings adjacent to or within the proximity of the receptor listed in **Table 12.5**, as it can be reasonably assumed the baseline acoustic conditions and predicted noise levels from Rosefield Solar Farm would be similar.

Table 12.5 – Noise sensitive receptors

ID	Name	Type	Corresponding monitoring location
R1	Beachfield	Residential	MP5
R2	Bernwood Farm	Residential	MP2
R3	Borshaw Farm	Residential	MP3
R4	Botolph Claydon	Residential	MP2
R5	Brickhill Way (Calvert)	Residential	MP9
R6	Calvert Cottages	Residential	MP9
R7	Catherine Cottages	Residential	MP7
R8	Catherine Farm	Residential	MP7
R9	Clayton Rd	Residential	MP3
R10	Dry Leys Farmhouse	Residential	MP4
R11	Finmere Hill House	Residential	MP5
R12	Hogshaw Farm	Residential	MP3
R13	Knowhill Farm	Residential	MP6
R14	Lower Farm	Residential	MP3
R15	Muxwell Farm	Residential	MP10
R16	Pond Farm	Residential	MP8
R17	Sion Hill Farm	Residential	MP1
R18	Woodland Barn	Residential	MP4

Future baseline

12.6.5. On the basis that the majority of Rosefield Solar Farm is located within a rural setting, typically comprising agricultural land use, there is generally not expected to be significant changes to the baseline conditions in the future.

12.6.6. In instances where Rosefield Solar Farm is located close to transport infrastructure, such as roads and railway lines, there is potential for increase in the traffic flows in the future baseline scenario. In the absence of significant alterations to the wider road or rail network, the variation in traffic flows would be expected to be incremental and therefore unlikely to give rise to perceptible changes in the acoustic environment.

12.6.7. However, other existing development and/or approved development(s), such as High Speed Rail 2 and East West Rail, are considered within **Chapter 18: Cumulative Effects**. A full assessment considering the potential for cumulative effects will be outlined within the ES.

12.7. Mitigation embedded into the design

12.7.1. This preliminary assessment has been based on the principle that measures have been 'embedded' into the design of Rosefield Solar Farm to remove potential likely significant effects as far as practicable, for example by the considered placement of infrastructure. Embedded (primary) environmental mitigation measures that are considered to be an inherent part of Rosefield Solar Farm are detailed within **Chapter 5: Approach to the EIA**. The embedded mitigation measures relevant to noise and vibration and the benefits these provide are outlined in **Table 12.6** below.

Table 12.6 – Embedded mitigation measures relevant to noise and vibration

Embedded mitigation measures relevant to noise and vibration	Benefit
Maximising the separation distance between proposed infrastructure and surrounding sensitive receptors, where practicable. This includes a minimum 250 m offset from the fence line around ITS, BESS, Rosefield Substation and Collector Compounds to residential properties, determined on a case-by-case basis.	Noise impact at the nearest noise sensitive receptors/residential properties is reduced.
Use of equipment with low noise emissions, where feasible.	Noise impact at the nearest noise sensitive receptors/residential properties is reduced.
Orientating noise emitting equipment to reduce noise level beyond the Site boundary.	Noise impact at the nearest noise sensitive receptors/residential properties is reduced.

12.8. Optionality

12.8.1. **Chapter 5: Approach to the EIA** sets out those elements of Rosefield Solar Farm for which optionality is present within the current design and sets out the scenarios assessed for the purpose of this PEIR.

12.8.2. The preliminary design principles as outlined in **Chapter 5: Approach to the EIA** and preliminary parameter plans (**Figures 3.1** to **3.5** in **Volume 2**) set out the reasonable 'worst case scenario' that has been assessed within this chapter.

12.8.3. Further to the optionality options discussed in **Chapter 5**, the following scenarios have been assessed for this preliminary noise and vibration assessment. It is expected that operating scenarios will be refined as part of the ongoing design post submission of the PEIR. This design

development may include consideration of alternative equipment specifications, locations and number of noise emitting equipment within the Site boundary. Prospective design solutions will not be progressed if the associated residual noise levels post-mitigation result in significant adverse effects.

Table 12.7 – Optionality scenarios assessed

Project element	Scenario assessed for this preliminary assessment
Balance of Solar System	The location of the BoSS has not yet been defined. Generally, the BoSS would comprise locating the inverter, transformer and switchgear equipment, independently outdoors, or within an enclosed ITS located throughout the fields shown in light blue on **Figure 1.2: Zonal Masterplan** in **Volume 2** and there is the option for either the inverters to be centralised or a hybrid solution of centralised and string inverters, as outlined in **Chapter 3: Description of Rosefield Solar Farm**. This preliminary assessment assumes the use of 29 central inverter/ITS stations distributed centrally across 18 fields.
Satellite Collector Compounds	There are five fields that are considered suitable for the two Satellite Collector Compounds, as shown in **Figure 1.2: Zonal Masterplan** in **Volume 2**. However, it is anticipated that one Collector Compound will be required in each Parcel containing Solar PV modules (Parcel 1 and Parcel 2). This preliminary assessment assumes the Satellite Collector Compounds will be located in Fields B10 and D17.
Main Collector Compound	There are four fields that are considered suitable for the Main Collector Compound, which are located in Parcel 3, as shown in **Figure 1.2: Zonal Masterplan** in **Volume 2** and detailed below. • Field E23 • Field E22 • Field E21 • Field E20 This preliminary assessment assumes the Main Collector Compound will be located in Field E23.

Project element	Scenario assessed for this preliminary assessment
BESS	There are several fields that are being considered for the siting of the BESS, as shown in **Figure 1.2: Zonal Masterplan** in **Volume 2**. For the purposes of the preliminary assessment, there are two options for the BESS locations in conjunction with the Rosefield Substation: Scenario 1. Rosefield Substation in Field E11 and BESS units located in Fields D8, D9 and E23 (**Figure 5.1: Zonal Masterplan Scenario 1** in **Volume 2**). Scenario 2. Rosefield Substation in Field E23 and BESS units located in Fields D8, D9 and E23 (**Figure 5.2: Zonal Masterplan Scenario 2** in **Volume 2**). For the purposes of this preliminary assessment, both options have been assessed.
Rosefield Substation	Two fields are being considered for the location of the Rosefield Substation, as indicated as 'Rosefield Substation Indicative Siting Zones' (marked as S) in **Figure 1.2: Zonal Masterplan** in **Volume 2**. For the purposes of the preliminary worst-case assessment, the following Rosefield Substation locations in conjunction with the BESS, have been considered: Scenario 1. Rosefield Substation in Field E11 and BESS units located in Fields D8, D9 and E23 (**Figure 5.1: Zonal Masterplan Scenario 1** in **Volume 2**). Scenario 2. Rosefield Substation in Field E23 and BESS units located in Fields D8, D9 and E23 (**Figure 5.2: Zonal Masterplan Scenario 2** in **Volume 2**). For the purposes of this preliminary assessment, both options have been assessed.

Preliminary assessment assumptions

Construction and decommissioning phases

12.8.4. At this preliminary assessment stage, detailed construction and decommissioning methodologies and plant lists have not been defined. The details of noise emitting plant/equipment suitable to inform a full

assessment are therefore not yet available nor sufficient to quantify impacts (and the significance of the resultant effects). As a result, a number of assumptions have been made as part of a qualitative impact assessment, including the anticipated construction methodology and associated plant/equipment lists.

12.8.5. The qualitative construction assessment has assumed the use of standard construction techniques appropriate for the type of works being undertaken.

12.8.6. During the decommissioning phase of Rosefield Solar Farm, it is assumed that the resultant noise levels will be broadly similar to the construction phase.

12.8.7. It is assumed that the normal construction working hours will be 07:00 to 19:00 hours Monday to Friday and 07:00 – 12:00 hours on Saturdays. No construction works shall be carried out on Sundays or Bank or Public Holidays without the prior arrangement/agreement with Buckinghamshire Council.

Operational (including maintenance) phase

12.8.8. Initial details of noise emitting plant/equipment associated with the operational phase fixed plant have been provided in **Table 12.8**. It should be noted that the final equipment supplier and selection may be subject to change; however, the assumed inputs currently available are sufficient to inform an understanding of potential impacts for the purposes of this preliminary assessment. It is expected that noise emitting plant/equipment will be refined as part of the ongoing design post submission of the PEIR. Alternative design solutions will not be progressed if the associated residual noise levels post-mitigation result in significant adverse effects.

12.8.9. At this stage, it has been assumed that all operational phase plant/equipment will operate continuously during both daytime and night-time periods i.e. no allowance has been made for reduced noise emissions during the hours of darkness. This represents the worst case scenario as the noise emissions from the BESS units and inverters are expected to reduce during hours of darkness.

12.9. Approach to the preliminary assessment

Construction and decommissioning phases - onsite construction activities

12.9.1. In the absence of detailed construction and decommissioning methodologies, a qualitative construction and decommissioning phase assessment has been undertaken.

12.9.2. The qualitative assessment has been undertaken based on the guidance contained within BS 5228, and has been used to determine whether the construction phase and decommissioning phase activities have the

potential to result in significant adverse effects at the surrounding sensitive receptors.

12.9.3. Construction and decommissioning activities will involve the use of a variety of working methods, with the resultant noise and vibration levels experienced by a receptor varying over time as the distances to plant items change and the type of construction activity change.

12.9.4. For the purposes of the qualitative assessment, the following construction activities have been considered:

- Main construction compound;
- Constructing access tracks (temporary and permanent);
- Site preparation and earthworks;
- Installation of boundary fencing;
- Foundations for solar PV modules;
- Substructure works for proposed infrastructure e.g. transformers, BESS, Rosefield Substation, central inverters/ITS; and
- Installation of proposed infrastructure.

12.9.5. The significance criteria given in Annex E of BS 5228-1 have been used to assess the potential for noise effects during the construction phase. Section E.3.2 details the 'ABC Method' of determining the potential significance of noise effects. This method defines threshold noise levels for different time periods which are dictated by the pre-construction ambient noise levels. If the construction phase noise levels exceed the appropriate threshold value, then a potential significant effect is indicated. On the basis of the measured ambient noise levels from the baseline survey, the lower bound daytime cut-off value of 65 dB $L_{Aeq,T}$ has formed the basis of the significance threshold.

Construction and decommissioning phases – road traffic

12.9.6. **Chapter 14: Traffic and Transport** provides details of the proposed routing of road traffic associated with the construction and decommissioning of Rosefield Solar Farm. Normal construction traffic will utilise the following road links, with abnormal (large) loads following an alternative route (**Figures 3.5a to 3.5d, Volume 2**):

- A34;
- M40 North;
- M40 South;
- A41;
- Station Road;
- Snake Lane;

- Clayton Road; and
- Granborough Road.

12.9.7. Baseline and construction traffic flows for each road link have been assessed for a 2028 construction year. Current traffic projections identify that peak construction traffic will occur in Month 4 of 2028 which has therefore been used to provide a worst-case assessment. At this stage, the baseline traffic has been provided as daily flows; however, this will be refined for the ES to consider the specific hours of construction.

12.9.8. The methodology contained within the Calculation of Road Traffic Noise Memorandum (CRTN) has predominantly been used to calculate the noise levels associated with increased road traffic flows, with the BS 5228-1 haul road calculation formula used for local road links on the basis that the minimal pre-development flows would mean that it would be beyond the scope of the CRTN. The CRTN method uses a number of input variables including traffic flow volume, vehicle speed, percentage of heavy goods vehicles, type of road surface, site geometry and the presence of noise barriers or acoustically absorbent ground to predict road traffic noise levels.

12.9.9. The CRTN traffic assessment focuses on the change in noise levels that are likely to occur on road links as a result of the construction phase works. Traffic noise predictions have been carried out at notional receptors located 10 m from the edge of the carriageway and 1.5 m above ground level to determine the change in noise level. Notional receptors are used because it is the change in traffic noise level that is of interest, not the absolute noise levels at any given receptor. The predicted changes in noise level would occur at noise-sensitive receptors along each of the roads considered, regardless of whether they have been specifically considered or not.

Operational (including maintenance) phase

12.9.10. Operational (including maintenance) phase impacts have been predicted using a computer noise model of the Rosefield Solar Farm layouts, using SoundPLAN v9.0. The model adopts the calculation method in ISO 9613-2, which is suitable for a wide range of engineering applications where the noise level outdoors is of interest. The calculation method considers the mechanisms of noise propagation, including geometrical divergence (also known as distance loss or geometric damping), atmospheric absorption, ground effect, reflection from surfaces and screening by obstacles, barriers and buildings.

12.9.11. The ISO 9613-2 method predicts noise levels under meteorological conditions favourable to noise propagation from the sound source to the noise-sensitive receptor e.g., downwind propagation or equivalently, propagation under a moderate ground-based temperature inversion as commonly occurs at night.

12.9.12. The operational phase noise emissions that have been used to carry out the preliminary assessment are presented in **Table 12.8**.

Table 12.8 – Operational phase noise emissions

Equipment	Quantity	Noise level	Notes
BESS			
BESS generic containers	500	65 dB(A) at 1 m distance (from the relevant kit).	Noise emitting from one side and one end. Noise emitting faces orientated inwards.
BESS Sungrow MVS SCC control and transformers	51	***Varying depending on unit surface:*** 59 dB(A) at 1 m (front) 52 dB(A) at 1 m (right) 71 dB(A) at 1 m (back) 61 dB(A) at 1 m (left) 62 dB(A) at 1 m (top)	Noise emitting from all sides of unit, orientated with the front of the containing facing the north-east
BESS auxiliary transformers	12	40 dB(A) at 1 m	Noise emitting from all sides of unit – 2.4 m x 2.5 m x 4.0 m (LxWxH)
Main Collector Compound			
Auxiliary transformers	12	40 dB(A) at 1 m	Noise emitting from all sides of unit – 2.4 m x 2.5 m x 4.0 m (LxWxH)
Satellite Collector Compound			
Main transformer	1	75 dB(A) at 1 m	Noise emitting from all sides of unit - 6.72 m x 2.74 m x 4.65 m (LxWxH)
Auxiliary transformers	1	40 dB(A) at 1 m	Noise emitting from all sides of unit – 2.4 m x 2.5 m x 4.0 m (LxWxH)
Rosefield Substation			
Main transformers	5	75 dB(A) at 1 m	Noise emitting from all sides of unit - 6.72 m x 2.74 m x 4.65 m (LxWxH)
Solar PV modules			

Equipment	Quantity	Noise level	Notes
7.6MVA INGECON central inverters/ITS stations	29	60 dB(A) at 10 m per station	29 central inverter/ITS stations distributed centrally across 19 fields. Each of the 29 stations includes 2 no. inverters each emitting 57 dB(A) at 10 m.

Receptor sensitivity

12.9.13. Receptor sensitivity has been categorised for a range of receptor types, as shown in **Table 12.9**, which has been informed from guidance contained in the following documents:

- DMRB LA 111; and
- Guidelines for Environmental Noise Impact Assessment.

Table 12.9 – Receptor sensitivity

Receptor sensitivity	Type of receptor
High	Residential properties, educational establishments, hospitals, places of worship, hotels, children's nurseries, nursing homes.
Medium	Commercial premises including offices, halls, public municipal areas, bars and restaurants.
Low	Industrial premises.
Negligible	All other areas such as those used primarily for agricultural purposes.

Magnitude of impact

12.9.14. The magnitude of the impact within this preliminary assessment has been described using the following scale:

- High;
- Medium;
- Low; and
- Negligible.

12.9.15. Although the lowest measure of magnitude of impact is defined as 'negligible', it should be noted that noise and vibration levels may still be

audible/perceptible during the construction, operational (including maintenance) and decommissioning phases of Rosefield Solar Farm.

12.9.16. The criteria in **Table 12.10** have been adopted for the assessment of magnitude of impact.

Table 12.10 – Magnitude of impact criteria for noise and vibration

Impact	Relevant guidance	Magnitude criteria			
		Negligible	Low	Medium	High
Construction and decommissioning phases – daytime noise[1][2]	BS 5228-1:2009 + A1+2014	Less than 55 dB $L_{Aeq,T}$	Between 55 & 65 dB $L_{Aeq,T}$	Between 65 & 75 dB $L_{Aeq,T}$	Greater than 75 dB $L_{Aeq,T}$
Construction phase - road traffic noise[3]	DMRB LA 111	Less than 1 dB increase in road traffic noise	1.0 to 2.9 dB increase in road traffic noise	3.0 to 4.9 dB increase in road traffic noise	Greater than or equal to 5 dB increase
Construction and decommissioning phases - vibration	BS 5228-2:2009 + A1:2014	Less than 0.3 mm/s PPV	0.3 to less than 1.0 mm/s PPV	1.0 to 9.9 mm/s PPV	Greater than or equal to 10 mm/s PPV
Operational phase – daytime noise[4][5]	BS 4142:2014 + A1:2019	Rating level less than 5 dB(A) below background sound level	In the range of 5 dB(A) below and 5 dB(A) above background sound level or rated noise level of up to 40 dB $L_{Ar, T}$	Between 5 and 10 dB(A) above background sound level or rated noise level of between 41 & 49 dB $L_{Ar, T}$	In excess of 10 dB(A) above background sound level or rated noise level equal to or greater than 50 dB $L_{Ar, T}$
Operational phase – night-time noise[4][5]	BS 4142:2014 + A1:2019	In excess of 5 dB(A) below background sound level	In the range of 5 dB(A) below and 5 dB(A) above background sound level or rated noise level of up to 35 dB $L_{Ar, T}$	Between 5 and 10 dB(A) above background sound level or rated noise level of between 36 & 44 dB $L_{Ar, T}$	In excess of 10 dB(A) above background sound level or rated noise level equal to or greater than 45 dB $L_{Ar, T}$
Notes:					

Impact	Relevant guidance	Magnitude criteria			
		Negligible	Low	Medium	High

1. Daytime construction phase noise levels are based on a time period 'T' which equates to the duration of a working day on site.
2. The construction noise impact criteria will apply if the works occur for a duration exceeding 10 or more days or nights in any 15 consecutive days or nights; or a total number of days exceeding 40 in any 6 consecutive months.
3. Where baseline traffic flows are low, consideration will be given to the absolute criteria for general construction works.
4. Operational (including maintenance) phase noise criteria are based on Rating Levels as defined in BS 4142 and refer to a time interval of 1-hour for the daytime period and 15-minute for the night-time period.
5. Magnitude impact subject to whichever is highest between daytime and night-time.

12.9.17. Regarding the operational magnitude of impact criteria, BS 4142 advises that where rating levels and background levels are low, which is typically the case in rural areas, the assessment of operational noise should take the absolute noise level into context. The ANC Guide to BS 4142 provides context to this by stating:

"BS 4142 does not define 'low' in the context of background sound levels ***nor rating levels. The note to the Scope of the 1997 version of BS 4142 defined very low background sound levels as being less than about 30 dB*** L_{A90}***, and low rating levels as being less than about 35 dB*** $L_{Ar,Tr}$*."*

12.9.18. The ANC Guide suggests that:

"…similar values would not be unreasonable in the context of BS 4142, ***but that the assessor should make a judgement and justify it where*** *appropriate".*

12.9.19. In this case, it is considered that a minimum rating level of 40 dB $L_{Ar,Tr}$ during the daytime, and 35 dB $L_{Ar,Tr}$ during the night, for the low magnitude impact criteria, would align with guidance in Planning Practice Guidance which defines noise below the lowest observed adverse effect level (LOAEL) as follows:

"Noise can be heard, but does not cause any change in behaviour, attitude ***or other physiological response. Can slightly affect the acoustic character*** *of the area but not such that there is a change in the quality of life."*

12.9.20. Furthermore, BS 8233:2014 and the Guidelines for Community Noise provide guidance levels which account for a range of potential adverse health effects from noise. For dwellings, the guidelines are focussed on sleep disturbance, as this occurs at a lower magnitude of exposure to noise and has the potential to lead to other, more severe physical and

psychological health effects over time. For internal noise within dwellings, a value of 30 dB $L_{Aeq, T}$ is stipulated for good sleeping conditions at night. However residents are likely to be inside their properties at night. BS 8233:2014 states that building envelope attenuation would be reduced by approximately 15 dB for a partially open window. Consequently, an external high-magnitude criterion, indicating a significantly adverse effect level (SOAEL) of 45 dB $L_{Ar,Tr}$ has been adopted for night-time.

12.9.21. Based on the adaptation of absolute limits, the World Health Organization provides its guidance on permissible levels, above which adverse effects are likely to occur. Therefore the criteria for LOAEL and SOAEL adopted within this preliminary assessment are considered as a design limit, above which the onset of LOAEL and SOAEL would occur.

Significance of effects

12.9.22. The overall significance of an effect is determined by combining the sensitivity of the receptor and magnitude of impact (as presented in **Table 12.11**). The assessment of significance relies on best practice and the relevant published standards and guidance documents as defined in **Section 12.3**.

12.9.23. The significance of an effect is reported as either '**significant'** or '**not significant'**. Where significance of effect is assessed as '**negligible'** or '**minor'**, the effect is **not significant**. Where the significance of effect is assessed as '**moderate'** or '**major'**, the effect is **significant**.

Table 12.11 – Determining significance of effects for noise and vibration

Magnitude of impact	Sensitivity of receptor/receiving environment to change			
	Negligible	Low	Medium	High
Negligible	Negligible	Negligible	Negligible	Negligible
Low	Negligible	Negligible	Negligible	Minor
Medium	Negligible	Negligible	Minor	Moderate
High	Negligible	Minor	Moderate	Major

12.10. Assessment of likely effects (without additional mitigation)

12.10.1. This section considers the effects that may arise during the construction, operation (including maintenance) and decommissioning phases of Rosefield Solar Farm in the absence of additional mitigation, taking into account the above embedded mitigation measures outlined in **Table 12.6** and assessing the reasonable worst case scenarios as outlined in **Table 12.7**.

Construction phase – onsite construction activities

12.10.2. **Table 12.12** provides indicative noise levels that would be generated by the primary construction activities, together with the corresponding distance from the works at which the daytime 65 dB $L_{Aeq,T}$ threshold criterion is likely to be met.

Table 12.12 – Predicted construction phase noise levels

Construction activity	Indicative activity noise level at 10 m distance	Approximate distance at which 65 dB $L_{Aeq,T}$ threshold will be met
Main Compound Construction	86 dB $L_{Aeq,T}$	110 m
Constructing access tracks (temporary and permanent)	87 dB $L_{Aeq,T}$	120 m
Installation of boundary fencing	77 dB $L_{Aeq,T}$	50 m
Site preparation and earthworks	87 dB $L_{Aeq,T}$	120 m
Foundations for solar PV modules	87 dB $L_{Aeq,T}$	120 m
Substructure works for proposed infrastructure e.g. transformers, BESS, central inverters/ITS	83 dB $L_{Aeq,T}$	65 m
Installation of proposed infrastructure	82 dB $L_{Aeq,T}$	55 m

12.10.3. Based on the separation distances presented in **Table 12.14**, it is expected that the majority of the construction works could be undertaken without causing an exceedance of the daytime 65 dB $L_{Aeq,T}$ threshold criterion.

12.10.4. Where works are being undertaken close to the Site boundary, there is potential that the construction works will result in an exceedance of the daytime criterion. On this basis, the magnitude of impact at **high** sensitivity receptors is considered to be up to **medium**, resulting in a temporary **moderate adverse** effect, which is considered **significant**.

12.10.5. Construction induced vibration will be generated by certain construction activities, such as piling, breaking and/or vibratory compaction, which may result in potential disturbance or interference with activities at the surrounding sensitive receptors when works are taking place close to the Site boundary. On this basis, the magnitude of impact at **high** sensitivity receptors is considered to be up to **medium**, resulting in a temporary **moderate adverse** effect, which is considered **significant**.

Construction phase – road traffic

12.10.6. The traffic data used to carry out the assessment road traffic assessment is presented in **Table 12.13**.

Table 12.13 – Traffic data

Road link	Road name	Daily traffic flow by scenario			
		Baseline (no construction) 2028		Baseline + development 2028	
1	A34	70,987	12 % HGV	71,122	12% HGV
2	M40 North	109,940	14% HGV	109,959	14% HGV
3	M40 South	70,862	11% HGV	70,880	11% HGV
4	A41	34,006	6% HGV	34,178	7% HGV
5	A41 Bicester	23,660	8% HGV	23,909	9% HGV
6	A41 West	13,105	18% HGV	13,354	19% HGV
7	A41 East	12,027	20% HGV	12,142	19% HGV
8	Station Road	1,093	23% HGV	1,455	27% HGV
9	Snake Lane	123	25% HGV	485	36% HGV
10	Clayton Road	1,510	16% HGV	1,873	21% HGV
11	Granborough Road[1]	-	-	157	53% HGV

Notes:
1. No baseline data provided at PEIR stage (to be assessed as part of the ES).

12.10.7. **Table 12.14** summarises the predicted change in noise levels resulting from increased traffic flow during the construction phase of Rosefield Solar Farm.

Table 12.14 – Assessment of likely significant effects during construction – increased traffic flow

Road link	Road name	Short-term noise level change, dB 2028 baseline to '2028 baseline + construction'
1	A34	0.0
2	M40 North	0.0
3	M40 South	0.0
4	A41	0.1
5	A41 Bicester	0.1
6	A41 West	0.2
7	A41 East	0.1
8	Station Road	2.4
9	Snake Lane	8.1
10	Clayton Road	2.0
11	Granborough Road[1]	-
Notes: 1. No baseline data provided at PEIR stage (to be assessed as part of the ES).		

12.10.8. It can be seen that construction traffic has the potential to increase noise levels by up to 8 dB along Snake Lane. The substantial increase in noise levels is a function of the low volume of traffic in the baseline scenario on this road link. There are limited noise sensitive receptors along this road which are set back by approximately 40 m and 300 m from the roadside. The resultant absolute noise levels at the affected receptors are therefore likely to fall below the negligible criteria for the construction phase (55 dB $L_{Aeq,T}$). On this basis, the magnitude of impact at **high** sensitivity receptors is considered to be **low**, resulting in a temporary **minor adverse** effect, which is considered **not significant**.

12.10.9. Noise predictions indicate that the effect of construction traffic elsewhere would increase noise levels by up to of 2.4 dB, with the greatest change occurring on local road links e.g. Station Road and Clayton Road. Where **high** sensitivity receptors are situated along these roads, the magnitude of impact would be considered **low**, resulting in a temporary **minor adverse** effect, which is considered **not significant**.

12.10.10. For the remaining road links that have been assessed, the noise levels are not likely to increase by more than 1 dB. As such, the magnitude of impact for **high** sensitivity receptors along the remaining roads considered is **negligible**, resulting in a **negligible** effect, which is considered **not significant**.

Operational (including maintenance) phase

12.10.11. Predicted noise levels from the operation (including maintenance) of the Rosefield Solar Farm are provided in **Table 12.15** and **Table 12.16** for Scenario 1 and Scenario 2 respectively, along with a preliminary assessment against the representative background sound levels ($L_{A90, T}$) and adopted low magnitude design targets. Predictions include the input plant source levels as identified in **Section 12.9**.

12.10.12. In accordance with the BS 4142 assessment methodology, where certain features of the specific noise level can increase the significance of impact of a sound level, a character correction is applied to provide a 'Rating Level'. The characteristics of the specific sound that would attract a character correction are tonality, impulsivity, intermittency (as defined by BS 4142) or other characteristic features that are readily discernible against the residual acoustic environment.

12.10.13. BS 4142 includes the addition of rating penalties (to the specific noise) as a factor of 'perceptibility', where the prominence of tonal or impulsive sound from a source can be readily distinguishable over the residual sound. For the purposes of this preliminary assessment, the addition of rating penalties considers the numerical comparison of the specific noise from operational fixed plant against the baseline residual sound level at each noise-sensitive receptor in order to determine perceptibility.

12.10.14. For the purposes of this preliminary assessment, either a 2 dB or 3 dB rating correction has been applied to the predicted specific levels. This would account for a situation either where a tone is just perceptible at the nearest noise sensitive receptor, or where specific sound is likely to be readily distinctive against the residual acoustic environment respectively. The rating correction has been determined through interrogation of the noise model results including the source contributions at each individual receptor.

12.10.15. Rating levels for Scenario 1 and Scenario 2, accounting for the cumulative impact of all operational-phase plant items running concurrently, are itemised in **Table 12.15** and **Table 12.16** respectively. The corresponding noise contour plots are presented in **Figures 12.3** and **12.4** in **Volume 2**.

Table 12.15 – Predicted operational phase rating levels and preliminary assessment – Scenario 1 (unmitigated)

Ref	Name	Rating level, dB $L_{Ar,Tr}$	Exceedance above representative background sound level, dB		Exceedance above LOAEL criteria, dB $L_{Ar,T}$[1]	
			Daytime	Night-time	Daytime	Night-time
R1	Beachfield	26	-7	-3	-14	-9
R2	Bernwood Farm	35	6	5	-5	0
R3	Borshaw Farm	36	7	12	-4	1
R4	Botolph Claydon	34	0	4	-6	-1
R5	Brickhill Way (Calvert)	33	-2	3	-8	-3
R6	Calvert Cottages	39	5	9	-1	4
R7	Catherine Cottages	38	7	15	-2	3
R8	Catherine Farm	32	1	9	-8	-3
R9	Clayton Rd	29	-1	5	-12	-7
R10	Dry Leys Farmhouse	27	-9	-2	-13	-8
R11	Finmere Hill House	33	0	4	-7	-2
R12	Hogshaw Farm	38	9	14	-2	3
R13	Knowhill Farm	35	3	5	-5	0
R14	Lower Farm	34	5	10	-6	-1
R15	Muxwell Farm	30	1	3	-11	-6
R16	Pond Farm	39	10	14	-1	4
R17	Sion Hill Farm	40	8	10	0	5
R18	Woodland Barn	25	-10	-3	-14	-9

Notes:
1. LOAEL aligned with the low impact criteria i.e. 40 dB L_{Ar} daytime, 35 dB L_{Ar} night-time.

12.10.16. Noise levels from the unmitigated Rosefield Solar Farm Scenario 1 are predicted to be highest at R17 Sion Hill Farm with levels of 40 dB L_{Ar} (exceeding the LOAEL design targets 5 dB(A) during the night-time).

12.10.17. Predicted noise levels from the unmitigated Rosefield Solar Farm Scenario 1 exceed the LOAEL design target and are therefore likely to result in a **medium** magnitude of impact at the following sensitive receptors:

- R6 – Calvert Cottages;
- R7 – Catherine Cottages;
- R12 – Hogshaw Farm;
- R16 – Pond Farm; and
- R17 – Sion Hill Farm.

12.10.18. As such, with regards to the unmitigated Rosefield Solar Farm Scenario 1, the magnitude of impact at the above **high** sensitivity receptors is considered to be up to **medium** resulting in a long-term **moderate adverse** effect, which is considered to be **significant**.

12.10.19. Predicted noise levels from the unmitigated Rosefield Solar Farm Scenario 1, are likely to result in a **low** magnitude of impact at the following sensitive receptors:

- R1 – Beachfield;
- R2 – Bernwood Farm;
- R3 – Borshaw Farm;
- R4 – Boltoph Claydon;
- R5 – Brickhill Way (Calvert);
- R8 – Catherine Farm;
- R9 – Clayton Road;
- R10 – Dry Lees Farmhouse;
- R11 – Finmere Hill House;
- R13 – Knowhill Farm;
- R14 – Lower Farm;
- R15 – Muxwell Farm; and
- R18 – Woodland Barn.

12.10.20. As such, with regards to the unmitigated Rosefield Solar Farm Scenario 1, the magnitude of impact at the above **high** sensitivity receptors is considered to be **low** resulting in a long-term **minor adverse** effect, which is considered to be **not significant**.

Table 12.16 – Predicted operational phase rating levels and preliminary assessment – Scenario 2 (unmitigated)

Ref	Name	Rating level, dB $L_{Ar,Tr}$	Exceedance above representative background sound level, dB		Exceedance above LOAEL criteria, dB $L_{Ar,T}$[1]	
			Daytime	Night-time	Daytime	Night-time
R1	Beachfield	26	-7	-3	-9	-9
R2	Bernwood Farm	35	6	5	0	0
R3	Borshaw Farm	37	8	13	2	2
R4	Botolph Claydon	35	1	5	0	0
R5	Brickhill Way (Calvert)	33	-2	3	-3	-3
R6	Calvert Cottages	39	5	9	4	4
R7	Catherine Cottages	38	7	15	3	3
R8	Catherine Farm	32	1	9	-3	-3
R9	Clayton Rd	29	0	5	-6	-6
R10	Dry Leys Farmhouse	27	-9	-2	-8	-8
R11	Finmere Hill House	33	0	4	-2	-2
R12	Hogshaw Farm	38	9	14	3	3
R13	Knowhill Farm	35	3	5	0	0
R14	Lower Farm	35	6	11	0	0
R15	Muxwell Farm	30	1	3	-5	-5
R16	Pond Farm	39	10	14	4	4
R17	Sion Hill Farm	38	6	8	3	3
R18	Woodland Barn	26	-10	-3	-9	-9

Notes:
1. LOAEL aligned with the low impact criteria i.e. 40 dB L_{Ar} daytime, 35 dB L_{Ar} night-time.

12.10.21. Noise levels from the unmitigated Rosefield Solar Farm Scenario 2 are predicted to be highest at R16 Pond Farm and R6 Calvert Cottages with

levels of 38 dB L_{Ar} (exceeding the LOAEL design target by 3 dB(A) during the night-time).

12.10.22. Predicted noise levels from the unmitigated Rosefield Solar Farm Scenario 2 exceed the LOAEL design target and are therefore likely to result in a **medium** magnitude of impact at the following sensitive receptors:

- R3 – Borshaw Farm;
- R6 – Calvert Cottages;
- R7 – Catherine Cottages;
- R12 – Hogshaw Farm;
- R16 – Pond Farm; and
- R17 – Sion Hill Farm.

12.10.23. As such, with regards to the unmitigated Rosefield Solar Farm Scenario 2, the magnitude of impact at the above **high** sensitivity receptors is considered to be up to **medium** resulting in a long-term **moderate adverse** effect, which is considered to be **significant**.

12.10.24. Predicted noise levels from the unmitigated Rosefield Solar Farm Scenario 2 are likely to result in a **low** magnitude of impact at the following sensitive receptors:

- R1 – Beachfield;
- R2 – Bernwood Farm;
- R4 – Boltoph Claydon;
- R5 – Brickhill Way (Calvert);
- R8 – Catherine Farm;
- R9 – Clayton Road;
- R10 – Dry Lees Farmhouse;
- R11 – Finmere Hill House;
- R13 – Knowhill Farm;
- R14 – Lower Farm;
- R15 – Muxwell Farm; and
- R18 – Woodland Barn.

12.10.25. As such, with regards to the unmitigated Rosefield Solar Farm Scenario 2, the magnitude of impact at the above **high** sensitivity receptors is considered to be **low** resulting in a long-term **minor adverse** effect, which is considered to be **not significant**.

Decommissioning phase

12.10.26. The likely noise and vibration impacts during the decommissioning phase are considered to be consistent with the construction phase, as it is envisaged that similar plant and works would be used. On this basis, the magnitude of impact at **high** sensitivity receptors is considered to be up to **medium**, resulting in a temporary **moderate adverse** effect, which is considered **significant**.

12.11. Additional mitigation measures

12.11.1. **Table 12.17** outlines the additional mitigation measures considered necessary for the construction, operational (including maintenance) and decommissioning phases. These are subject to the final design and will be refined during the preparation of the ES.

Table 12.17 – Additional mitigation for construction, operation (including maintenance) and decommissioning phases

Phase	Additional (secondary and tertiary) mitigation
Construction and decommissioning traffic	Best Practicable Means (BPM) as defined by the Control of Pollution Act 1974 would be implemented, which would serve to minimise the noise and vibration impacts at noise-sensitive receptors in the vicinity of the construction and decommissioning works. These include (amongst others): • Careful selection of plant and construction methods. Only plant conforming to relevant national standards, directives and recommendations on noise and vibration emissions shall be used. • Use of site enclosures, housing and temporary stockpiles/barriers, where reasonably practicable and necessary, to provide acoustic screening at the earliest opportunity. • Plant and equipment liable to create noise and/or vibration whilst in operation to be located, as far as reasonably practicable, away from sensitive receptors and away from walls reflecting towards sensitive receptors. • Careful selection of routing options within the Site for construction vehicles. • Machines in intermittent use to be shut down or throttled down to a minimum during periods between works. • All plant, equipment and noise control measures applied to plant and equipment to be maintained in good and efficient

Phase	Additional (secondary and tertiary) mitigation
	working order and operated such that noise emissions are minimised as far as reasonably practicable. Any plant, equipment or items fitted with noise control equipment found to be defective will not be operated until repaired. • Minimise drop heights of materials (i.e. lorry with lifting boom or dumper carefully depositing materials). • As far as is reasonably practicable, locate and orientate semi-static equipment in a manner which minimises the noise impact on sensitive receptors. • Regular briefings for operators of moving plant to emphasise the importance of noise mitigation, specifically avoiding movement over irregular surfaces (which tends to create more noise / vibration emissions). • A programme of community liaison to be carried out, including notification of works and details of the complaints process. An Outline Construction Environmental Management Plan will be submitted in support of the DCO application. The Outline Construction Environmental Management Plan will include noise and vibration management measures that are based on the results of the ES (once construction methods, plant and programme have been defined). An Outline Decommissioning Environmental Management Plan will be submitted in support of the DCO application. The Outline Decommissioning Environmental Management Plan will include noise and vibration management measures that are based on the results of the ES (once construction methods, plant and programme have been defined).
Operational noise	Implementation/adoption of further acoustic mitigation measures as part of the ongoing design to inform the ES, which could include: • Reducing the number of plant items (following engineering review); • Increasing the distance between source and receiver i.e. locating central inverters at the furthest point practicable from receptors;

Phase	Additional (secondary and tertiary) mitigation
	• Reducing noise at source through refinement of the engineering requirements in order to adopt lower noise emitting operational plant items; and • Use of barriers and/or enclosures where reasonably practicable including the following: – 3.5 m high barrier around the BESS container areas; – 5 m high barrier around sections of the boundary of the project substation; – 3.5 m high absorptive barriers around central inverters that are located in close proximity to noise sensitive receptors; and – Introduction of enclosures and/or barriers around the main transformers within the project substation and satellite collector compound. An Outline Operational Environmental Management Plan will be submitted in support of the DCO application. The Outline Operational Environmental Management Plan will include noise management measures that are based on the results of the ES.

12.12. Assessment of residual effects (with additional mitigation)

Construction phase – onsite construction activities

12.12.1. Following the implementation of the additional mitigation measures outlined above, the magnitude of impact at **high** sensitivity receptors during the construction and decommissioning phases is expected to be **low**, resulting in a temporary **minor adverse** residual effect, which is considered **not significant**.

Operational (including maintenance) phase

12.12.2. Rating levels for Scenario 1 and Scenario 2, accounting for the cumulative impact of all operational-phase plant items running concurrently following the implementation of the additional mitigation measures, are itemised in **Table 12.18** and **Table 12.19** respectively. The corresponding noise contour plots are presented in **Figures 12.5** and **12.6** in **Volume 2**.

Table 12.18 – Predicted operational phase rating levels and preliminary assessment – Scenario 1 (mitigated)

Ref	Name	Rating level, dB $L_{Ar,Tr}$	Exceedance above representative background sound level, dB		Exceedance above LOAEL criteria, dB $L_{Ar,T}$[1]	
			Daytime	Night-time	Daytime	Night-time
R1	Beachfield	25	-8	-4	-15	-10
R2	Bernwood Farm	34	5	4	-7	-2
R3	Borshaw Farm	34	5	10	-6	-1
R4	Botolph Claydon	32	-2	2	-8	-3
R5	Brickhill Way (Calvert)	29	-5	-1	-11	-6
R6	Calvert Cottages	35	1	5	-6	-1
R7	Catherine Cottages	35	4	12	-5	0
R8	Catherine Farm	30	-1	7	-10	-5
R9	Clayton Rd	32	3	8	-9	-4
R10	Dry Leys Farmhouse	23	-13	-6	-17	-12
R11	Finmere Hill House	33	0	4	-7	-2
R12	Hogshaw Farm	35	6	11	-5	0
R13	Knowhill Farm	34	2	4	-6	-1
R14	Lower Farm	32	3	8	-8	-3
R15	Muxwell Farm	28	-1	1	-12	-7
R16	Pond Farm	34	5	9	-6	-1
R17	Sion Hill Farm	33	1	3	-7	-2
R18	Woodland Barn	25	-11	-4	-15	-10

Notes:
1. LOAEL aligned with the low impact criteria i.e. 40 dB L_{Ar} daytime, 35 dB L_{Ar} night-time.

12.12.3. Predicted noise levels from Rosefield Solar Farm Scenario 1 following the implementation of the additional mitigation are likely to result in a **low** magnitude of impact at all of the noise sensitive receptors.

12.12.4. As such, a **low** magnitude of impact upon these **high** sensitivity receptors would result in a long-term **minor adverse** residual effect, which is considered to be **not significant**.

Table 12.19 – Predicted operational phase rating levels and preliminary assessment – Scenario 2 (mitigated)

Ref	Name	Rating level, dB $L_{Ar,Tr}$	Exceedance above representative background sound level, dB		Exceedance above LOAEL criteria, dB $L_{Ar,T}$[1]	
			Daytime	Night-time	Daytime	Night-time
R1	Beachfield	25	-8	-4	-15	-10
R2	Bernwood Farm	33	4	3	-7	-2
R3	Borshaw Farm	35	6	11	-6	-1
R4	Botolph Claydon	32	-2	2	-8	-3
R5	Brickhill Way (Calvert)	29	-5	-1	-11	-6
R6	Calvert Cottages	35	1	5	-6	-1
R7	Catherine Cottages	35	4	12	-5	0
R8	Catherine Farm	30	-1	7	-10	-5
R9	Clayton Rd	26	-3	2	-14	-9
R10	Dry Leys Farmhouse	23	-13	-6	-17	-12
R11	Finmere Hill House	33	-1	4	-8	-3
R12	Hogshaw Farm	35	6	11	-5	0
R13	Knowhill Farm	34	2	4	-6	-1
R14	Lower Farm	31	2	7	-9	-4
R15	Muxwell Farm	28	-2	1	-13	-8
R16	Pond Farm	34	5	9	-6	-1
R17	Sion Hill Farm	33	1	3	-7	-2

Ref	Name	Rating level, dB $L_{Ar,Tr}$	Exceedance above representative background sound level, dB		Exceedance above LOAEL criteria, dB $L_{Ar,T}$[1]	
			Daytime	Night-time	Daytime	Night-time
R18	Woodland Barn	25	-11	-4	-15	-10

Notes:
1. LOAEL aligned with the low impact criteria i.e. 40 dB L_{Ar} daytime, 35 dB L_{Ar} night-time.

12.12.5. Predicted noise levels from Rosefield Solar Farm Scenario 2 following the implementation of the additional mitigation are likely to result in a **low** magnitude of impact at all of the noise sensitive receptors.

12.12.6. As such, a **low** magnitude of impact upon these **high** sensitivity receptors would result in a long-term **minor adverse** residual effect, which is considered to be **not significant**.

12.13. Opportunities for enhancement

12.13.1. Opportunities for enhancement in relation to noise and vibration are not available, given Rosefield Solar Farm would introduce new sources of noise and vibration which previously did not exist in the prevailing environment.

12.14. Difficulties and uncertainties

12.14.1. Three of the baseline noise survey locations incorporated measurements during both school holidays and school term time (MP2, MP8 and MP10). This was necessary following equipment installed on site being tampered with by third parties, which resulted in the survey duration being extended. Given the rural setting of the measurement locations and distance from strategic transport infrastructure, it is not considered that measurements taken during the school holiday period had an influence on the resulting dataset. This is corroborated when comparing the data with the measured noise levels at the same positions taken during school term time.

12.14.2. Details of plant/equipment during the construction and decommissioning stages have not yet been defined. The preliminary assessment of likely effects has therefore been considered in qualitative terms. The construction methodology, plant selection and programme will be defined during the preparation of the ES, as further information becomes available.

12.14.3. Details of the noise emitting plant/equipment associated with the operational (including maintenance) phase of the Rosefield Solar Farm have not yet been finalised at this stage, including quantity, their operating scenarios and location. Further refinement of the design of the Rosefield

Solar Farm would be undertaken to ensure compliance with the appropriate acoustic criteria.

12.14.4. Consultation has been undertaken with Buckinghamshire Council concerning the application of the relevant standards which are pertinent to the initial assessment of operational noise. As expected, baseline noise monitoring identified the residual noise environment to be of 'low' order. Further consultation is proposed with Buckinghamshire Council to confirm the contextual assessment and application of absolute limits to define the LOAEL and SOAEL, as identified within this preliminary assessment.

12.15. Further work required to inform the ES

12.15.1. To form a robust ES, the following work is proposed so that all aspects will be suitably considered.

Construction and decommissioning phases

- Assessment of likely noise and vibration levels generated by the onsite works in accordance with BS 5228.
- Further detailed assessment of construction traffic flow fluctuations on the public highway (and private roads where applicable) during the various construction phases of Rosefield Solar Farm. This will be calculated using the methodology set out in the CRTN publication, using flow data provided by the traffic consultant.
- Assessment of construction traffic on the various temporary site access routes where possible, using the haul route method outlined in Section F.2.5 of BS 5228-1. The assessment will consider the flow data provided by the traffic consultant.
- Consideration of potential cumulative effects as a result of Rosefield Solar Farm in combination with other existing development and/or approved developments.

Operational (including maintenance) phase

- Refinement of the noise prediction model for the operational fixed plant, which will account for the proposed and/or revised site layout, noise emitting plant/equipment (in octave bands where such data is available) to be introduced and any embedded acoustic mitigation measures.
- An operational phase noise assessment for the operational fixed plant undertaken in accordance with the methodology outlined in BS 4142. This will identify the requirement for additional mitigation measures.
- Further details of operational (including maintenance) phase plant and equipment will be outlined in the ES which demonstrates that it would not generate a perceptible level of vibration, or alternatively, would be used in locations unlikely to result in significant vibration effects at either human or ecological sensitive receptors.

- Further consideration of potential cumulative effects as a result of the Rosefield Solar Farm in combination with other existing development and/or approved developments (refer to **Chapter 18: Cumulative Effects**).

13. Population

13.1. Introduction

13.1.1. This chapter presents a preliminary assessment of the likely significant effects arising from the construction, operation (including maintenance) and decommissioning of Rosefield Solar Farm upon population and should be read in conjunction with the following figures in **Volume 2**:

- **Figure 3.3a: Indicative Green Infrastructure Parameters Key Plan;** and
- **Figure 13.1: Study Area for Population**

13.1.2. There is no standard definition of what 'population' is; however, in this chapter the term population relates primarily to socio-economic effects on the local population as a result of Rosefield Solar Farm.

13.2. Stakeholder engagement

13.2.1. The views of stakeholders have been taken into account through formal responses to the EIA Scoping report via the EIA Scoping Opinion and non-statutory consultation. No specific consultation has been undertaken to inform this preliminary assessment. However, engagement with Buckinghamshire Council, related to the population assessment, will be undertaken in order to inform the ES.

13.3. Legislative framework, planning policy and guidance

13.3.1. This preliminary assessment has been undertaken with regard to the following legislation, planning policy and guidance.

Legislation

13.3.2. There is no legislation of relevance to the population assessment.

National planning policy

- Overarching National Policy Statement for Energy (NPS EN-1) (2023)[1] – Section 3.3 is of relevance for a population assessment as it outlines the need to secure sufficient energy that meets the demands of the population and the targets of businesses and consumers alike. Section 4.4 is also of relevance as, whilst the Section is specific to health, the

[1] Department for Energy Security and Net Zero. (2023). Overarching National Policy Statement for Energy (EN-1). Available online: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1

considerations are also appropriate for population. Section 5.13 details the planning policy for assessing socio-economic impacts;

- National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (2023)[2] – Section 2.10 gives specific consideration to solar development including recognition of how solar sites are likely to be large and typically of a rural nature and may therefore suffer from suitability of access issues which can impact on population;
- National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (2023)[3] – Section 1.1 details that new network infrastructure should balance community impacts, for example, against decarbonisation targets; and
- National Planning Policy Framework (NPPF) (2023)[4] includes an overarching presumption in favour of sustainable development. This is achieved through the delivery of interdependent social, economic and environmental objectives.

Local planning policy

- Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021)[5], specifically Policies S1 'Sustainable development for Aylesbury Vale', T1 'Delivering the sustainable transport vision', C3 'Renewable Energy', C4 'Protection of public rights of way', T7 'Footpaths and cycle routes', 'BE3 'Protection of the amenity of residents' and I1 'Green Infrastructure'.

Guidance

13.3.3. There is no statutory guidance for the assessment of likely significant effects relating to population. However, in order to make this preliminary assessment as robust as possible, Design Manual for Roads and Bridges

[2] Department for Energy Security and Net Zero (2023). National Policy Statement for Renewable Energy Infrastructure (EN-3). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3

[3] Department for Energy Security and Net Zero (2023). National Policy Statement for Electricity Networks Infrastructure (EN-5). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5

[4] Ministry of Housing, Communities and Local Government and Department for Levelling Up, Housing and Communities. (2023). 'National Planning Policy Framework'. Available online: https://www.gov.uk/government/publications/national-planning-policy-framework--2

[5] Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021). Available online: [redacted]

(DMRB) LA 112 population and human health[6] (hereafter referred to as 'DMRB LA 112') has been used.

13.3.4. Whilst DMRB relates to schemes promoted by National Highways, the assessment methodology within DMRB LA 112 provides a recognised method of assessing the likely significance of effects anticipated in relation to population in the absence of any other industry recognised guidance.

13.3.5. In addition, Succeeding as a Place: Achieving our Shared Vision for Buckinghamshire to 2050[7] (version produced for the Buckinghamshire Growth Board) has been taken into account. It collectively prioritises improving the economic, environmental and social well-being of the local population, fostering sustainable growth, strategic planning and regional identity development, thereby aiming to enhance overall socio-economic conditions for the local population.

13.4. Study area

13.4.1. In accordance with DMRB LA 112, the Study area includes land within the Site boundary plus all receptors within 500 m of the Site boundary in all directions. The Study area for population is shown in **Figure 13.1** in **Volume 2**.

13.5. Establishing baseline conditions

13.5.1. A desk-based review of the Study area has been undertaken and captures all potential receptors. Receptors can be any existing dwellings, buildings, agricultural holdings/operations, community assets or users of public rights of way (PRoW).

13.5.2. A desktop review has been undertaken to inform this preliminary assessment in order to identify any planning applications that are currently being determined or have been recently consented within the Study area that would introduce employment opportunities, community assets or dwellings to the Study area (i.e., new developments that would introduce new receptors).

13.5.3. The following data sources have been used to understand the existing population conditions:

[6] Design Manual for Roads and Bridges. (2019). LA 112 Population and Human Health. Available online: [redacted]

[7] Buckinghamshire Council. (2021). 'Succeeding as a Place: Achieving our Shared Vision for Buckinghamshire to 2050'. Available online: [redacted]

- Buckinghamshire Council – Public Rights of Way Map[8];
- Buckinghamshire Council – Aylesbury Vale Area Planning Application Search[9];
- Buckinghamshire Council – Community Right to Bid: assets of community value[10]; and
- Freely available digital maps – Google Maps.

13.6. Environmental baseline

Private property and housing

13.6.1. The village of Calvert is located immediately adjacent to the western most boundary of the Site. The hamlet of Botolph Claydon is located approximately 170 m north of Parcel 2.

13.6.2. There are also a number of interspersed properties around the edges of the Site boundary, but not located within named settlements.

13.6.3. Therefore, within the Study area, there are a number of private properties of which most are assumed to be residential dwellings.

Community land and assets

13.6.4. DMRB LA 112 defines community land as ‘common land, village greens, open green space, allotments, sports pitches etc.’ and community assets as ‘e.g. village halls, healthcare facilities, education facilities, religious facilities etc’. St Mary’s Church is located 450 m west of Parcel 3, in the village of East Claydon, and could be considered a community asset.

13.6.5. No other community land or assets are present within the Study area.

Agricultural land holdings

13.6.6. There are currently fifteen agricultural operations within the Study area, with seven being within the Site boundary and eight being outside of the Site boundary.

[8] Buckinghamshire Council. (2024). Public Rights of Way Map. Available online: https://prow.buckscc.gov.uk/standardmap.aspx
[9] Buckinghamshire Council. (2024). Aylesbury Vale Area planning portal. Available online: https://publicaccess.aylesburyvaledc.gov.uk/online-applications//search.do?action=simple&searchType=Application
[10] Buckinghamshire Council. (2024). Community Right to Bid: assets of community value. Available online: https://www.buckinghamshire.gov.uk/community-and-safety/community-right-to-bid-assets-of-community-value/

13.6.7. The eight farming operations outside of the Site boundary are not expected to have any land included in Rosefield Solar Farm, nor are they expected to experience any changes to their ongoing operations during any phase of Rosefield Solar Farm.

Development land and business

13.6.8. There are 17 businesses present within the Study area aside from agricultural land holdings. A brief summary of the nature of these businesses and their location in relation to the Site boundary is presented below:

- Hogshaw Farm & Wildlife Park is located approximately 250 m east of the Site boundary. The farm is open to the public throughout the day from 10am till 5:30pm (excluding Mondays and Tuesdays) and is used for children's birthday parties and after school activities as well as housing an onsite cafe;
- Bunsoy Services Ltd. is located approximately 325 m from the Site boundary. The business is a parcel delivery service warehouse that operates between 9am and 5pm, Monday to Friday;
- TCS Biosciences has offices located approximately 430 m north of the Site boundary in the village of Botolph Claydon. The offices are open generally from 8.30am to 5pm Monday to Friday. TCS Biosciences manufactures and distributes laboratory reagents, test kits and quality control reagents;
- Claydon Clocks is located approximately 455 m west of the Site boundary, in the village of East Claydon. The business provides clock repair services and operates between 9am and 5pm, Monday to Friday;
- Mutts and Mogs is a pet store located approximately 490 m east of the Site boundary and operates from 8am to 5pm, Monday to Friday;
- The Mushroom Village Bar is located approximately 490 m north of the Site boundary in the village of Botolph Claydon. The bar is located in the old village hall and is also used as an events space. It is open on Thursdays and Saturdays 8pm till 11pm and Fridays 6pm till 11pm;
- Star Massage Ltd. is located approximately 500 m west of the Site boundary in the village of Calvert. The business offers massage services and operates throughout the day from 9am till 5pm;
- The Claydon Estate is a National Trust property and visitor attraction located north of the Site boundary. The Claydon Estate encompasses Claydon House which is an 18th Century country house and a number of supporting businesses that offer refreshments and leisure opportunities to visitors. The Estate is open to visitors on selected days, mainly Friday, Saturday and Sundays from approximately 10am to 4pm;
- Loved Before is located on the Claydon Estate north of the Site boundary. The business is a soft toy shop that restores old toys and resells them;

- Featherstone Jewellery is located north of the Site on the Claydon Estate. The business is an independent jewellery shop and is open Thursday to Sunday from 10.30am till 2pm and Tuesday to Friday, 9am to 4pm;
- Signature Flowers is located north of the Site on the Claydon Estate. The business is a florist that also provides flower arranging classes and is open Monday and Saturday from 10am till 2pm and Tuesday to Friday, 9am to 4pm;
- The Flying Fox is located on the Claydon Estate, north of the Site boundary. The Flying Fox showroom is located on the Claydon Estate and sells home interior and gifts. The business is open Monday, Friday and Saturday from 10am till 5pm and on Thursdays and Sundays from 10am till 4pm. The business is also open on Tuesdays and Wednesdays by appointment;
- The Braided Rug Company is located on the Claydon Estate north of the Site boundary. The business sells handmade rugs and is open Monday, Thursday, Friday and Saturdays and by appointment on Tuesdays and Wednesdays. The opening hours vary;
- The Spa @ The Courtyard is a spa offering various spa and beauty treatments, located on the Claydon Estate, north of the Site boundary. The business is open Mondays and Tuesdays from 12pm till 8pm and Wednesdays, Fridays, Saturdays and Sundays from 9.30am till 5.30pm;
- New Aura is located on the Claydon Estate, north of the Site boundary. The business offers hair dressing services and specialises in the fitting of hair extensions. The business operates by appointment only from Wednesday to Sundays;
- The Stables is located on the Claydon Estate to the north of the Site boundary. The business is a venue that can accommodate up to 40 guests for sit down dining, the venue is often used for business and networking events and private functions. The business operates on a by hire basis; and
- Phoenix Kitchen is located on the Claydon Estate, north of the Site boundary. The business is a restaurant open Thursday to Mondays, from 10am till 4pm.

13.6.9. There is no land allocated for employment use, and there are no planning applications yet to be determined that might generate employment opportunities within the Study area.

Walkers, cyclists and horse riders

13.6.10. The following PRoWs are within, adjacent to, or intersect the Site and allow movement across the Site for walkers, cyclists and, where permitted, horse riders. (Note: Footpaths are paths that allow users to walk on said paths whilst Bridleways also allow users to ride bicycles and horses. All distances below reflect the length of each respective PRoW in its entirety):

- SCL/12/1, Steeple Claydon, Footpath, 608 m
- SCL/13/2, Steeple Claydon, Footpath, 1,331 m;
- SCL/12/2, Steeple Claydon, Footpath, 579 m;
- MCL/15/1, Middle Claydon, Footpath, 1,096 m;
- MCL/16/1, Middle Claydon, Footpath, 94 m;
- ECL/9/1, East Claydon, Footpath, 830 m;
- ECL/9/2, East Claydon, Footpath, 515 m;
- QUA/41/1, Quainton, Footpath, 340 m;
- QUA/38/1, Quainton, Footpath, 387 m;
- ECL/8/2, East Claydon, Footpath, 614 m;
- ECL/7/2, East Claydon, Footpath, 1,311 m;
- ECL/8/1, East Claydon, Footpath, 1,079 m;
- ECL/6/1, East Claydon, Footpath, 807 m;
- ECL/4/2, East Claydon, Footpath, 463 m;
- ECL/3/2, East Claydon, Footpath, 280 m;
- ECL/3A/1, East Claydon, Footpath, 495 m;
- MCL/20/2, Middle Claydon, Bridleway, 712 m;
- MCL/18/2, Middle Claydon, Bridleway, 855 m;
- GUN/33/1, Grendon Underwood, Bridleway, 314 m;
- GUN/33/2, Grendon Underwood, Bridleway, 1,022 m;
- MCL/17/1, Middle Claydon, Bridleway, 1,550 m;
- ECL/10/1, East Claydon, Bridleway, 327 m;
- ECL/10/2, East Claydon, Bridleway, 812 m;
- MCL/19/1, Middle Claydon, Bridleway, 908 m;
- ECL/10/4, East Claydon, Bridleway, 307 m;
- ECL/10/3, East Claydon, Bridleway, 56 m;
- ECL/10/5, East Claydon, Bridleway, 141 m;
- QUA/42/2, Quainton, Bridleway, 524 m;
- QUA/40/1, Quainton, Bridleway, 223 m;
- QUA/40/2, Quainton, Bridleway, 362 m;
- QUA/39/1, Quainton, Footpath, 1,806 m;
- QUA/40/3, Quainton, Bridleway, 510 m; and
- ECL/5/1, East Claydon, Bridleway, 1,203 m.

13.6.11. There are two long distance paths within the Study area, these being: Midshires Way and Bernwood Jubilee Way. Midshires Way runs for 230 miles from Chiltern Hills to Stockport and intersects Parcel 3 east of the Site. Bernwood Jubilee Way runs 61 miles as a circular route within south Buckinghamshire. The route crosses the Site in a north/south alignment through the centre of the Site.

Future baseline

13.6.12. For the purposes of this preliminary assessment, the future baseline in which Rosefield Solar Farm does not take place is expected to remain the same as the current baseline i.e., the existing properties would remain, businesses would continue to operate as they currently do, and the PRoW network would likely continue to be used to a similar level. Over time, these buildings may be replaced, businesses may alter or close, new businesses may start trading and PRoW may be used more or less frequently.

13.7. Mitigation embedded into the design

13.7.1. This preliminary assessment has been based on the principle that measures have been 'embedded' into the design of Rosefield Solar Farm to remove potential likely significant environmental effects as far as practicable, for example by the considered placement of infrastructure. Embedded (primary) environmental mitigation measures that are considered to be an inherent part of Rosefield Solar Farm are detailed within **Chapter 5: Approach to the EIA**.

13.7.2. Such measures have been identified in order to remove or minimise the potential for impacts to the receptors within the Study area. Those embedded mitigation measures relevant to population comprise the following:

- A minimum 55 m offset to Bernwood Jubilee Way from the fence line;
- A minimum 20 m offset to Midshires Way from the fence line;
- All other PRoW will have a minimum 10 m offset from the fence line;
- A minimum 250 m offset from the fence line around ITS, BESS, Rosefield Substation and Collector Compounds to residential properties determined on a case by case basis; and
- Offsets from the fence line around the Solar PV development to residential properties will be determined on a case by case basis.

13.8. Optionality

13.8.1. **Chapter 5: Approach to the EIA** sets out those elements of Rosefield Solar Farm for which optionality is present within the current design and sets out the scenarios assessed for the purpose of this PEIR.

13.8.2. The preliminary design principles as outlined in **Chapter 5: Approach to the EIA** and preliminary parameter plans (**Figures 3.1** to **3.5** in **Volume 2**) set out the reasonable 'worst case scenario' that has been assessed within this chapter. The 'worst case scenario' options in relation to this preliminary population assessment are described in **Table 13.1** below

Table 13.1 – Optionality scenarios assessed

Project element	Scenario assessed for this preliminary assessment
Satellite Collector Compounds	This preliminary assessment assumes that the Satellite Collector Compound in Parcel 1 would be located within Field B10. Field B10 is located 40 m east of a PRoW and is near to residential properties within the village of Calvert, which is why it is considered a reasonable worst case. This preliminary assessment assumes that the Satellite Collector Compound in Parcel 2 would be located within Field D9. This location would impact a PRoW which directly crosses the width of the field. Therefore, there may be a requirement to divert this PRoW should this option be taken forward, and this is why this scenario has been chosen for assessment as a reasonable worst case.
Main Construction Compounds and Satellite Construction Compounds	This preliminary assessment assumes that for Parcel 1, the Main Construction Compound would be situated in Field B23 South and the Satellite Construction Compound would be located in Field B6. This scenario is worst case as Field B23 South is located in closer proximity to residential receptors and a PRoW crosses Field B6. This preliminary assessment assumes that for Parcel 2, the Main Construction Compound would be situated in Field D7 and the Satellite Construction Compound will be located in Field D27. This scenario is worst case as Field D7 is approximately 426 m from a cluster of residential receptors surrounding Botolph Clayton and a PRoW runs adjacent to the field. This preliminary assessment assumes that for Parcel 3, the Main Construction Compound would be situated in either Field E23, E22 or E21 and the Satellite Construction Compound would be situated in Field E11. A PRoW runs adjacent to the field boundaries of Fields E23, E22 and E21 and a PRoW traverses Field E11. The above scenarios are anticipated to have the worst case effects in relation to population because of the need for PRoW diversions and the proximity to existing residential receptors.

Project element	Scenario assessed for this preliminary assessment
BESS	This preliminary assessment assumes that the BESS would be located in accordance with Scenario 1, with the Rosefield Substation located within Field E11 and the BESS units located within Fields D8, D9 and D23. There is a PRoW that crosses the width of Field E11 and this is expected to be diverted as a result of the Rosefield Solar Farm. Scenario 1 is anticipated to have the worst case effects in relation to population because of the need for a diversion in Field E11, with Scenario 2 having no such diversions.
Rosefield Substation	This preliminary assessment assumes that, in accordance with Scenario 1, Rosefield Substation would be located within Field E11. As above, there is a PRoW that crosses the width of the field and this is expected to be diverted as a result of Rosefield Solar Farm. Scenario 1 is anticipated to have the worst case effects in relation to population because of the need for a diversion in Field E11, with Scenario 2 having no such diversions.
Cable route to connect the Solar PV Modules, BoSS, Collector Compounds, Rosefield Substation and BESS	The indicative location of the main cable route between the Parcels and the potential routing options detailed below and presented in **Figure 3.2: Indicative Cable Route Location** in **Volume 2**. • Option A – Indicative cable route to the north of Home Wood, connecting Parcel 1 and 2 • Option B – Indicative cable route to the south of Home Wood, connecting Parcel 1 and 2 For the purposes of this preliminary assessment, Option B has been assessed as this is considered to be the worst case scenario.

Preliminary assessment assumptions

13.8.3. For the purposes of this preliminary assessment, it has been assumed that during the construction, operational (including maintenance) and decommissioning phases, the worst case scenario with regards to potential impacts to population receptors has been chosen.

13.9. Approach to the preliminary assessment

13.9.1. As described above, in the absence of statutory guidance for the assessment of likely significant effects on population receptors, the assessment methodology described in DMRB LA 112 has been followed.

13.9.2. In accordance with DMRB LA 112, this preliminary assessment has considered the likelihood of significant effects for land use and accessibility relating to the following five receptor groups:

- Private property and housing;
- Community land and assets;
- Development land and businesses;
- Agricultural land holdings; and
- Walkers, cyclists and horse riders.

13.9.3. This preliminary assessment has considered likely significant effects during the construction and operation (including maintenance) phases of Rosefield Solar Farm. As the level of effects during decommissioning is expected to be similar to or less than those during construction, the decommissioning phase has not been considered further within this preliminary assessment.

13.9.4. Through each of the five receptor groups outlined above, consideration has been given to the presence and number of receptors as described in **Section 13.6** above. Where receptors are absent from the Study area, no further consideration has been given to the potential for likely significant effects.

13.9.5. For each receptor that is present, professional judgement has been used to consider the likely significant effects that Rosefield Solar Farm would have and whether any likely significant effect is likely to be beneficial, neutral or adverse.

13.9.6. The receptor value (sensitivity) detailed in DMRB LA 112 has been used to determine the sensitivity of each receptor to change, as presented in **Table 13.2** below.

Table 13.2 – Environmental value (sensitivity) and descriptions

Receptor value (sensitivity)	Description
Very high	**Private property and housing:** 1) existing private property or land allocated for housing located in a local authority area where the number of households are expected to increase by >25% by 2041 (ONS data); and/or 2) existing housing and land allocated for housing (e.g. strategic housing sites) covering >5 ha and/or >150 houses. **Community land and assets where there is a combination of the following:** 1) complete severance between communities and their land/assets, with little/no accessibility provision;

Receptor value (sensitivity)	Description
	2) alternatives are only available outside the local planning authority area; 3) the level of use is very frequent (daily); and 4) the land and assets are used by the majority (>=50%) of the community. **Development land and businesses:** 1) existing employment sites (excluding agriculture) and land allocated for employment (e.g. strategic employment sites) covering >5 ha. **Agricultural land holdings:** 1) areas of land in which the enterprise is wholly reliant on the spatial relationship of land to key agricultural infrastructure; and 2) access between land and key agricultural infrastructure is required on a frequent basis (daily). **Walkers, cyclists and horse riders:** 1) national trails and routes likely to be used for both commuting and recreation that record frequent (daily) use. Such routes connect communities with employment land uses and other services with a direct and convenient walkers, cyclists and horse riders route. Little/no potential for substitution; 2) routes regularly used by vulnerable travellers such as the elderly, school children and people with disabilities, who could be disproportionately affected by small changes in the baseline due to potentially different needs; and 3) rights of way for walkers, cyclists and horse riders crossing roads at grade with >16,000 vehicles per day.
High	**Private property and housing:** 1) private property or land allocated for housing located in a local planning authority area where the number of households are expected to increase by 16-25% by 2041 (ONS data); and/or 2) existing housing and land allocated for housing (e.g. strategic housing sites) covering >1-5 ha and/or >30-150 houses. **Community land and assets where there is a combination of the following:** 1) there is substantial severance between community and assets, with limited accessibility provision; 2) alternative facilities are only available in the wider local planning authority area;

Receptor value (sensitivity)	Description
	3) the level of use is frequent (weekly); and 4) the land and assets are used by the majority (>=50%) of the community. **Development land and businesses:** 1) existing employment sites (excluding agriculture) and land allocated for employment (e.g. strategic employment sites) covering >1 – 5 ha. **Agricultural land holdings:** 1) areas of land in which the enterprise is dependent on the spatial relationship of land to key agricultural infrastructure; and 2) access between land and key agricultural infrastructure is required on a frequent basis (weekly). **Walkers, cyclists and horse-riders:** 1) regional trails and routes (e.g. promoted circular walks) likely to be used for recreation and to a lesser extent commuting, that record frequent (daily) use. Limited potential for substitution; and/or 2) rights of way for walkers, cyclists and horse riders crossing roads at grade with >8,000 - 16,000 vehicles per day.
Medium	**Private property and housing:** 1) houses or land allocated for housing located in a local authority area where the number of households is expected to increase by >6-15% by 2041 (ONS data); and/or 2) existing housing and land allocated for housing (e.g. strategic housing sites) covering <1 ha and/or <30 houses. **Community land and assets where there is a combination of the following:** 1) there is severance between communities and their land/assets but with existing accessibility provision; 2) limited alternative facilities are available at a local level within adjacent communities; 3) the level of use is reasonably frequent (monthly); and 4) the land and assets are used by the majority (>=50%) of the community. **Development land and businesses:** 1) existing employment sites (excluding agriculture) and land allocated for employment (e.g. strategic employment sites) covering <1ha. **Agricultural land holdings:**

Receptor value (sensitivity)	Description
	1) areas of land in which the enterprise is partially dependent on the spatial relationship of land to key agricultural infrastructure; and 2) access between land and key agricultural infrastructure is required on a reasonably frequent basis (monthly). **Walkers, cyclists and horse riders** 1) public rights of way and other routes close to communities which are used for recreational purposes (e.g. dog walking), but for which alternative routes can be taken. These routes are likely to link to a wider network of routes to provide options for longer, recreational journeys; and/or 2) rights of way for walkers, cyclists and horse riders crossing roads at grade with >4,000 – 8,000 vehicles per day.
Low	**Private property and housing:** 1) proposed development on unallocated sites providing housing with planning permission/in the planning process. **Community land and assets where there is a combination of the following:** 1) limited existing severance between community and assets, with existing full Disability Discrimination Act (DDA) DDA 1995 [Ref 2.N] compliant accessibility provision; 2) alternative facilities are available at a local level within the wider community; 3) the level of use is infrequent (monthly or less frequent); and 4) the land and assets are used by the minority (>=50%) of the community. **Development land and businesses:** 1) proposed development on unallocated sites providing employment with planning permission/in the planning process. **Agricultural land holdings:** 1) areas of land which the enterprise is not dependent on the spatial relationship of land to key agricultural infrastructure; and 2) access between land and key agricultural infrastructure is required on an infrequent basis (monthly or less frequent). **Walkers, cyclists and horse riders:** 1) routes which have fallen into disuse through past severance, or which are scarcely used because they do not

Receptor value (sensitivity)	Description
	currently offer a meaningful route for either utility or recreational purposes; and/or 2) rights of way for walkers, cyclists and horse riders crossing roads at grade with <4,000 vehicles per day.
Negligible	**Private property and housing:** 1) N/A. **Community land and assets where there is a combination of the following:** 1) no or limited severance or accessibility issues; 2) alternative facilities are available within the same community; 3) the level of use is very infrequent (a few occasions yearly); and 4) the land and assets are used by the minority (>=50%) of the community. **Development land and businesses:** 1) N/A. **Agricultural land holdings:** 1) areas of land which are infrequently used on a non-commercial basis. **Walkers, cyclists and horse riders** 1) N/A.

13.9.7. The magnitude of impact from DMRB LA 112 has been used to consider the likely magnitude of impact to each key receptor, as presented in **Table 13.3**.

Table 13.3 – Magnitude of impact and typical descriptions

Magnitude of impact (change)	Typical description
Major	**Private property and housing, community land and assets, development land and businesses and agricultural land holdings:** 1) loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements. e.g. direct acquisition and demolition of buildings and direct development of land to accommodate highway assets; and/or 2) introduction (adverse) or removal (beneficial) of complete severance with no/full accessibility provision. **Walkers, cyclists and horse riders:**

Magnitude of impact (change)	Typical description
	>500 m increase (adverse)/decrease (beneficial) in walkers, cyclists and horse riders journey length.
Moderate	**Private property and housing, community land and assets, development land and businesses and agricultural land holdings:** 1) partial loss of/damage to key characteristics, features or elements, e.g. partial removal or substantial amendment to access or acquisition of land compromising viability of property, businesses, community assets or agricultural holdings; and/or 2) introduction (adverse) or removal (beneficial) of severe severance with limited/moderate accessibility provision. **Walkers, cyclists and horse riders:** >250 m – 500 m increase (adverse) or decrease (beneficial) in walkers, cyclists and horse riders journey length.
Minor	**Private property and housing, community land and assets, development land and businesses and agricultural land holdings:** 1) a discernible change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements, e.g. amendment to access or acquisition of land resulting in changes to operating conditions that do not compromise overall viability of property, businesses, community assets or agricultural holdings; and/or 2) introduction (adverse) or removal (beneficial) of severance with adequate accessibility provision. **Walkers, cyclists and horse riders:** >50 m - 250 m increase (adverse) or decrease (beneficial) in walkers, cyclists and horse riders journey length.
Negligible	**Private property and housing, community land and assets, development land and businesses and agricultural land holdings:** 1) very minor loss or detrimental alteration to one or more characteristics, features or elements. e.g. acquisition of non-operational land or buildings not directly affecting the viability of property, businesses, community assets or agricultural holdings; and/or 2) very minor introduction (adverse) or removal (beneficial) of severance with ample accessibility provision. **Walkers, cyclists and horse riders:** <50 m increase (adverse) or decrease (beneficial) in walkers, cyclists and horse riders journey length.

Magnitude of impact (change)	Typical description
No change	No loss or alteration of characteristics, features, elements or accessibility; no observable impact in either direction.

13.9.8. The significance of effect has then been derived by combining the value (sensitivity) of the receptor with the magnitude of impact as a result of Rosefield Solar Farm as presented in **Table 13.4**, and as described in DMRB LA 112. Effects can be either adverse or beneficial. An effect of '**moderate'**, '**very large'** or '**large**' is deemed to be **significant**. A '**neutral**' or '**slight**' effect is deemed **not significant**.

13.9.9. Where the significance matrix indicates a range for the effect significance (e.g. 'slight or moderate'), professional judgement can be applied to select one option (which would be justified by evidence, as appropriate) or an effect significance range can be applied. If a significance of effect is assigned as 'slight or moderate', this would be considered significant unless further information could be provided to downgrade the significance effect to 'slight'.

Table 13.4 – Significance of effect matrix

Sensitivity	Magnitude of impact				
	No change	Negligible	Minor	Moderate	Major
Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight
Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
Very high	Neutral	Slight	Slight or Moderate	Large or Very Large	Very Large

13.10. Assessment of likely effects (without additional mitigation)

13.10.1. This section considers the likely effects that may arise during the construction, operation (including maintenance) and decommissioning phases of Rosefield Solar Farm in the absence of additional mitigation, taking into account the above embedded mitigation measures outlined in **Section 13.7** and assessing the reasonable worst case scenarios as outlined in **Table 13.1**.

Private property and housing

13.10.2. No properties or houses would need to be demolished to facilitate the construction and/or operation (including maintenance) of Rosefield Solar Farm.

13.10.3. None of the land that would be used to construct, operate and decommission Rosefield Solar Farm is allocated for residential development and no new planning applications have been submitted for housing development within the Site boundary at the time of writing this preliminary assessment. Therefore, there will be no population based impacts on private property or housing during construction, operation (including maintenance) or decommissioning and this element is not considered further within this preliminary population assessment. Other potential impacts to private property and housing are considered within the respective Air Quality (**Chapter 6**), Noise and Vibration (**Chapter 12**) and Landscape and Visual (**Chapter 11**) chapters in this PEIR.

Community land and assets

13.10.4. Rosefield Solar Farm would cover land that is presently used as agricultural land. A church is located within the Study area, to the north but outside of the Site boundary. Based on the location of the church and the nature of Rosefield Solar Farm, impacts to its use are not expected to be experienced at this community asset and therefore it can continue to operate as it currently does.

13.10.5. There are no other community assets or land within the Study area and therefore potential effects to community land and assets are not considered further within this preliminary assessment.

Agricultural land holdings, development land and business

13.10.6. Potential impacts in relation to the seven agricultural operations within the Site boundary will be subject to full assessment in the ES in accordance with the approach and methods outlined in this chapter. Based on a preliminary assessment and assuming adequate mitigation measures are in place, no significant effects on the agricultural operations are considered likely. However, without mitigation there could be a significant adverse effect on agricultural businesses.

13.10.7. The eight farm operations situated beyond the Site boundary but within the Study area will not have any land included within Rosefield Solar Farm. During the construction phase, there may be a short term increase in the number of vehicles within the area. This increase in traffic numbers may have a negative impact on agricultural businesses when trying to access their properties or whilst moving livestock. However, any such impacts would be short term and temporary in their nature. During the operational (including maintenance) phase, the volume of traffic is unlikely to be noticeably different from current levels and therefore no such likely effects are anticipated for farming operations. As no land outside of the Site boundary is being used for Rosefield Solar Farm, there are not expected to be any long term impacts relating to severance, access or long term viability of farm holdings to these agricultural operations as a result of any phases of Rosefield Solar Farm. As such, no significant likely effects are

expected for agricultural land holdings and these receptors are not considered further within this preliminary assessment.

13.10.8. Beyond farming operations, there are 17 other businesses present within the Study area which provide employment opportunities for local people and some that live further away. All of the businesses are outside of the Site boundary.

13.10.9. The nature of the majority of these businesses is not expected to be sensitive to the construction or operational (including maintenance) phases of Rosefield Solar Farm and therefore it is unlikely that any jobs will be at risk in these businesses.

13.10.10. **Chapter 9: Cultural Heritage** concluded that Claydon House and, gardens associated with the estate, may be subject to adverse significant impacts to setting as a result of the loss of designed views from this heritage asset. It is possible that the impact to setting may adversely affect the visitor experience and therefore lead to a reduction in visitor numbers to Claydon House and the associated gardens. As a result there may then be less footfall in the locality and therefore there is potential for reduced revenue for the businesses located inside the grounds of Claydon House.

13.10.11. The increase in construction staff during the construction phase has the potential to increase spend at nearby cafes and restaurants including Phoenix Kitchen. The increase in footfall has the potential to lead to increased spend at these local businesses. Any beneficial significant effects would be short term and will be assessed within the ES.

13.10.12. There is likely to be an increase in the volume of traffic during the construction phase which may prevent some customers accessing local businesses. However, any such effects would be short term and temporary. During the operational (including maintenance) phase, there are no proposed diversions to local roads and therefore, it is not expected that any customers would be prevented or discouraged from accessing the businesses as normal. As these impacts would only occur during the short term and temporary construction period, it is unlikely any businesses would have to close and therefore it is unlikely there would be any job losses as a result of Rosefield Solar Farm.

13.10.13. Preston Farms Limited occupies land within the Site boundary, some of which is used for grazing of horses and sheep associated with TCS Biosciences. The development of Rosefield Solar Farm may present a challenge to the business in how they continue to provide grazing land for horses and sheep.

Walkers, cyclists and horse riders

13.10.14. The ‘worst case’ scenario with regards to PRoW is expected to arise from Rosefield Solar Farm infrastructure being placed across an existing PRoW route at Field E11, and therefore a permanent diversion is expected to be

required. This diversion would move the existing PRoW by less than 100 m to the north to follow the existing wall on the northern extent of Field E11, a diversion of approximately 115 m. This can be seen in **Figure 3.3a** in **Volume 2**.

13.10.15. A footpath diversion is being proposed west of Shrubs Wood and east of Field B4. This would run for approximately 870 m which is a decrease in the existing length of the PRoW of 312 m as can be seen in **Figure 3.3a** in **Volume 2**.

13.10.16. A new permissive footpath is proposed following the northern boundary of Field B20, then the perimeters of B17, B11 and B10 as seen in **Figure 3.3a** in **Volume 2**. This is a new footpath, not a diversion, and as such forms an additional and beneficial enhancement to the existing PRoW network. The approximate length of the newly proposed footpath is 1.9 km and would allow walkers only to cross the field and continue to Knowl Hill before joining the existing PRoW network near Shrubs Wood. However, given the location of this new footpath and the relative number of other PRoW in the area, it is unlikely to be a significant benefit and therefore it is not considered further within this preliminary assessment.

13.10.17. Where reasonably practicable, existing PRoWs would be retained in their current locations during the construction and operation (including maintenance) phases. Any diversions required during the construction phase could lead to temporary impacts to users of PRoWs.

13.10.18. If any permanent changes to the routing of PRoWs are required, it is expected that the new route would be the shortest feasible route and would aim to provide a suitable replacement route with similar characteristics to that being lost.

13.11. Additional mitigation

Walkers, cyclists and horse riders

13.11.1. The details and management of any changes to the PRoW network would be provided in an Outline Public Rights of Way Management Plan, which will be submitted in support of the DCO application. The Outline Public Right of Way Management Plan will describe the planned approach to the management of PRoWs during the construction, operational (including maintenance) and decommissioning phases of Rosefield Solar Farm. The key principles of the Outline Public Rights of Way Management Plan will be to demonstrate how the existing PRoW network would remain available for use or, where diversions are required, how they would minimise impacts to PRoW users whilst maintaining safety for all.

13.11.2. Any changes to PRoW will be discussed with Buckinghamshire Council in order to ensure there are suitable diversions or replacements in place.

Agricultural land holdings, development land and business

13.11.3. **Chapter 9: Cultural Heritage** has concluded that an Outline Operational Environmental Management Plan will be written and this will include mitigation to minimise the risk of potential impacts to the settings of heritage assets during the operational (including maintenance) phase. This will include design measures to minimise impacts to settings attributes that may arise from security lighting, operational noise and associated traffic and the installation of educational boards within the Development Order Limits.

13.12. Assessment of residual effects (with additional mitigation)

Walkers, cyclists and horse riders

13.12.1. As discussed in **Section 13.10**, it is proposed there will be a change to the alignment of the PRoW running through Field E11 which would result in an increased travel distance for users of the PRoW of a distance of approximately 155 m. The sensitivity of the receptor is **medium**. In accordance with DMRB LA 112, any increase in length of a PRoW that is less than 200 m but more than 50 m is deemed to have a **minor** magnitude of impact. Therefore, the significance of effect is **slight adverse**, which is considered **not significant**.

13.12.2. An additional footpath diversion is proposed west of Shrubs Wood and east of Field B4. This runs for approximately 870 m which is a decrease in length of 312 m compared with the existing length of the PRoW. The sensitivity of the receptor is **medium**. In accordance with DMRB LA 112, any increase in length of a PRoW that is between 250 m and 500 m in length is deemed to have a **moderate** magnitude of impact. However, as this change is a decrease in the length of the PRoW this will be a beneficial change for users of PRoW. Therefore, the significance of effect is **moderate** which is **significant but beneficial.**

13.12.3. The implementation of the Outline Public Right of Way Management Plan would help to minimise effects to users of the PRoW beyond the increase in length of the PRoW discussed above.

13.12.4. No other PRoWs are expected to be diverted temporarily or permanently based on the current design layout.

Agricultural land holdings, development land and business

13.12.5. There is the potential for adverse effects to the setting of Claydon House as a result of the construction and operational phase of Rosefield Solar Farm (see **Chapter 9: Cultural Heritage**). Per **Chapter 9**, the value of the receptor is **high** and the magnitude of change is **minor**. Therefore the

significance of effect is **slight or moderate adverse** which **are considered to be significant or potentially significant.**

13.12.6. On a precautionary basis this preliminary assessment assumes that there may be less footfall in the locality as a result of potential effects to the setting of Claydon House and that, therefore, there is potential for reduced revenue for the businesses located inside the grounds of Claydon House. Per LA 112, the sensitivity value of the businesses in this area is **medium**. On the basis that there may be a discernible adverse change to the setting of Claydon House, and assuming a worst case scenario that these businesses are reliant on custom from visitors that are mainly in the local area to visit Claydon House, along with consideration of embedded mitigation and the distance of over 500 m from Claydon House to the Solar PV development, the magnitude of impact is expected to be **minor** or **moderate**. Combining the value of the receptor and the magnitude of effect would give a **slight** and **not significant** effect or **moderate** and **significant** effect. A further assessment of the significance of effect will be undertaken within the ES and this will consider the conclusions of the Cultural Heritage assessment. The potential for adverse effects to these businesses is highlighted at this stage only as a precaution as the preliminary heritage assessment has concluded there may or may not be significant effects to setting. Should the heritage assessment within the ES identify there are likely significant adverse effects to setting; further assessment work will be undertaken to inform the population assessment in the ES. Should the heritage assessment in the ES conclude there are no likely significant effects, it is expected that the population assessment will also conclude there will not be any likely significant effects to businesses located inside the grounds of Claydon House.

13.13. Opportunities for enhancement

13.13.1. Opportunities exist to improve the accessibility and connectivity of existing PRoW by implementing measures such as enhanced signage or maintenance or upgrades to the surface. These enhancements could facilitate safer and more convenient passage for users and also cultivate a heightened sense of connectivity within the broader network of public pathways.

13.14. Difficulties and uncertainties

13.14.1. The information provided in this PEIR is preliminary and is based on the information available at the time of writing. As a result of the statutory consultation process, it is expected that the design and layout of Rosefield Solar Farm may change. Such alterations may influence the receptors and PRoW pertinent to Rosefield Solar Farm, as well as the nature of the impact upon them. A full assessment of likely significant effects will be reported in the ES.

13.15. Further work required to inform the ES

13.15.1. To form a robust ES, the following work is proposed so that all aspects will be suitably considered:

- A further review of the number of residential properties within the Study area will be undertaken and reported in the ES;
- The continuation of design work to inform the DCO application, together with any relevant feedback received during the statutory consultation process, which may require further population assessment work to be undertaken;
- Further consultation will take place with Buckinghamshire Council with regards to further assessment and the design of Rosefield Solar Farm, and evidence of agreement with Buckinghamshire Council will be included in the ES chapter; and
- Further information relating to job creation and loss, agricultural businesses and economic benefits/negatives resulting from Rosefield Solar Farm will be included within the ES. These effects are not expected to be significant; however, they will be considered in order to give a comprehensive assessment of the potential for population and socio-economic effects.

14. Transport and Access

14.1. Introduction

14.1.1. This chapter reports the initial assessment of likely significant effects arising from Rosefield Solar Farm upon transport and access during the construction and operational (including maintenance) phases.

14.1.2. This chapter should be read with the following appendices in **Volume 3**:

- **Appendix 14.1 – Transport Assessment**; and
- **Appendix 14.2 – Draft Outline Construction Traffic Management Plan**.

14.2. Stakeholder engagement

14.2.1. **Table 14.1** provides a summary of the engagement undertaken to date to inform this preliminary assessment.

Table 14.1 – Engagement undertaken to date

Stakeholder	Date and method	Key matters discussed	How this matter has been addressed
Oxfordshire County Council	3 October 2023, Email and telephone call	Transport scoping and potential for impact on the Oxfordshire County Council road network. Request for detail of committed developments to be included.	Impact review undertaken on A41 and A34 corridors. Use of Low National Road Traffic Forecast (NRTF) assumptions to determine future traffic flows.
National Highways	27 October 2023, Teams meeting	Transport scoping and potential for impact on the trunk road network.	Impact review undertaken for the M40 corridor.
Buckinghamshire Council	19 December 2023, Teams meeting	Transport scoping and potential for impact on the Buckinghamshire Council road network. Discussion on access routing and compare access options via Snake Lane/Claydon Road vs route through Grendon Underwood and Calvert.	Impact review of all relevant Buckinghamshire Council roads undertaken. Traffic surveys undertaken on both access routes.

Stakeholder	Date and method	Key matters discussed	How this matter has been addressed
		Agreement on traffic survey locations.	
Buckinghamshire Council	30 May 2024, Teams meeting	Agreement of access route via Snake Lane/Claydon Road. Review of initial traffic impact figures. Discussion on potential road improvements.	The agreed access route has been assessed and reported in this chapter. Initial access works are included in the Draft Outline Construction Traffic Management Plan (**Appendix 14.2** in **Volume 3**).

14.3. Legislative framework, planning policy and guidance

14.3.1. This preliminary assessment has been undertaken with regard to the following legislation, planning policy and guidance.

Legislation

14.3.2. There is no legislation of relevance to the transport and access assessment.

National planning policy

- Overarching National Policy Statement for Energy (NPS EN-1) (2023)[1] – Section 5.14 details the planning policy for transport and access matters;
- National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (2023)[2] – Section 2.10 gives specific consideration to solar

[1] Department for Energy Security and Net Zero. (2023). Overarching National Policy Statement for Energy (EN-1). Available online: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1

[2] Department for Energy Security and Net Zero (2023). National Policy Statement for Renewable Energy Infrastructure (EN-3). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3

development including the assessment of traffic and transport impacts; and

- National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (2023)[3]- notes that consideration in the assessment should include grid connection infrastructure impacts.
- National Planning Policy Framework (NPPF) (2023)[4] – the Considering Development Proposals section outlines the requirements for all developments that are anticipated to generate significant movements to prepare a transport assessment to assess the likely impacts of the Proposed Development[i].

Local planning policy

- Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021)[5] - Planning Policy T5 noting the need for a Transport Assessment to consider traffic impacts and the need for a Staff Travel Plan;
- Buckinghamshire Council, Local Transport Plan 4, 2018[6] - Policy 3 noting the Council's need to manage the impacts of new developments.

Guidance

- Buckinghamshire Council, Highways Development Management Guidance, 2018[7];

[3] Department for Energy Security and Net Zero (2023). National Policy Statement for Electricity Networks Infrastructure (EN-5). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5

[4] Ministry of Housing, Communities and Local Government and Department for Levelling Up, Housing and Communities (2023) National Planning Policy Framework. Available online: https://www.gov.uk/government/publications/national-planning-policy-framework--2

[5] Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021). Available online: [redacted]

[6] Buckinghamshire Council (2016), 'Buckinghamshire's Local Transport Plan 4'. Available online at: [redacted]

[7] Buckinghamshire Council (2016), 'Highways Development Management Guidance: Managing the transport and travel impact of new developments'. Available online at [redacted]

- Planning Practice Guidance "Travel Plans, Transport Assessments and Statements"[8];
- Institute of Environmental Management and Assessment (IEMA) (2023) "Environmental Assessment of Traffic and Movement"[9]; and
- National Highways, *et al*, Design Manual for Roads and Bridges LA 104: Environmental assessment and monitoring[10].

14.4. Study area

14.4.1. The Study area is based on those roads that are expected to experience increased traffic flows associated with the construction of Rosefield Solar Farm. The geographic scope has been determined through a review of other developments in the area, Ordnance Survey (OS) plans and an assessment of the potential origin locations of construction staff and supply locations for construction materials.

14.4.2. Bulk materials for use on the Site will be sourced from existing supply locations located to the west. The appointed contractors will confirm the sources of materials in the finalised Construction Traffic Management Plan that would be secured pursuant to the DCO as a requirement.

14.4.3. Electrical component, plant and general deliveries are likely to originate along the M40 corridor from the Southeast and the Midlands.

14.4.4. Staff engaged during the construction process will likely be based within the major urban areas of Bicester and Aylesbury during the construction phase.

14.4.5. The proposed Study area therefore includes the road links most likely to be impacted by the proposed movements associated with Rosefield Solar Farm and comprises:

- The A34 to the southwest of Bicester;
- The M40 to the north and south of Junction 9;

[8] Ministry of Housing, Communities and Local Government, Ministry of Housing, Communities & Local Government (2018 to 2021) and Department for Levelling Up, Housing and Communities (2014), 'Travel Plans, Transport Assessments and Statements'. Available online at: https://www.gov.uk/guidance/travel-plans-transport-assessments-and-statements

[9] Institute of Environmental Management and Assessment, (2023), "Environmental Assessment of Traffic and Movement'

[10] National Highways, *et al*, Design Manual for Roads and Bridges LA 104: Environmental assessment and monitoring. Available online:

- The A41 from its junction with the M40 through to Waddesdon;
- Station Road/Dewes Lane from its junction with the A41 to the Buckingham Railway Centre;
- Snake Lane/Fiddlers Field from its junction at the Buckingham Railway Centre to its junction with Claydon Road;
- Claydon Road from its junction with Snake Lane/Fiddlers Field to its junction with Quainton Road/Granborough Road; and
- Granborough Road between its junction with Claydon Road and the proposed Site access junction.

14.4.6. The proposed Study area is illustrated in **Figure 4** in **Appendix 14.1** in **Volume 3** and has been discussed and agreed with Buckinghamshire Council, Oxfordshire County Council and National Highways.

14.5. Establishing baseline conditions

14.5.1. The following data sources have been used to gain a comprehensive understanding of the existing transport and access conditions in the vicinity of Rosefield Solar Farm:

- OS data for the Study area;
- Buckinghamshire Council Public Rights of Way (PRoW) map[11];
- Buckinghamshire Council Greenway map[12];
- Sustrans National Cycle Network route map[13]; and
- The online resource, www.crashmap.co.uk[14].

14.5.2. In addition to these resources, a review of the Department for Transport (DfT) road traffic database[15] has been undertaken to review traffic flows for the A41, M40 and A34.

[11] Buckinghamshire Council (2024), 'Public rights of way map'. Available online at: https://prow.buckscc.gov.uk/standardmap.aspx
[12] Buckinghamshire Council (2024), 'Buckinghamshire Greenway Map'. Available online at: https://www.buckinghamshire.gov.uk/parking-roads-and-transport/walking-cycling-and-wheeling/plans-to-improve-walking-cycling-and-wheeling/the-buckinghamshire-greenway/
[13] Sustrans (2024), 'National Cycle Network Map'. Available online at: [redacted]
[14] Crashmap (2024), 'www.crashmap.co.uk'
[15] Department for Transport (2024), 'Road traffic statistics'. Available online at: https://roadtraffic.dft.gov.uk/#6/55.254/-6.053/basemap-regions-countpoints

14.5.3. Further traffic survey data has also been included for other links located within the Study area using Automatic Traffic Count surveys:

- A41 west of the Station Road / Dewes Lane junction;
- A41 east of the Station Road / Dewes Lane junction;
- Station Road / Dewes Lane;
- Snake Lane / Fiddlers Field;
- Claydon Road; and
- Granborough Road.

14.5.4. All of the surveys were undertaken in consultation with Buckinghamshire Council and were undertaken in January 2024. A further survey on Granborough Road was undertaken in June 2024.

14.5.5. All traffic flow data provided in this chapter has been summarised into Car/Light Goods Vehicle (LGV), Heavy Goods vehicle (HGV) and total traffic flows. All flows reported are two way flows.

14.6. Environmental baseline

14.6.1. A full review of sustainable travel links (PRoW, bridleways and cycle routes) and road links within the Study area has been undertaken and is described in **Appendix 14.1** in **Volume 3**.

14.6.2. Construction of Rosefield Solar Farm is assumed to commence in 2028 and be completed in 2030.

14.6.3. To assess the likely significant effects during the construction phase, base year traffic flows have been determined by applying a National Road Traffic Forecast (NRTF) low growth factor to the surveyed traffic flows. The subsequent baseline traffic flows for 2028 are provided in **Table 14.2**.

Table 14.2 – 2028 baseline traffic flows

Road link	Car & LGV	HGV	Total traffic
A34	62,425	8,562	70,987
M40 North	94,674	15,266	1099,40
M40 South	63,209	7,653	70,862
A41	31,824	2,182	34,006
A41 Bicester	21,713	1,947	23,660

Road link	Car & LGV	HGV	Total traffic
A41 West	10,730	2,375	13,105
A41 East	9,670	2,357	12,027
Station Road/Dewes Lane	838	255	1,093
Snake Lane/Fiddlers Field	92	30	123
Claydon Road	1,267	243	1,510
Granborough Road	270	82	352
Please note that rounding errors may occur			

14.6.4. A review of traffic accidents on the online road safety resource Crashmap.co.uk for a five year period (2018 – 2022) has indicated that there were three recorded traffic accidents on the proposed access route from the A41 to the proposed Site access junction.

14.6.5. The proposed access strategy has been developed to avoid construction trips being routed through sensitive areas as far as possible. Early discussions with Buckinghamshire Council suggested a review of access via Grendon Underwood and Calvert; however this would bring construction traffic though both villages. The proposed construction routes avoid impacts on these and other nearby villages.

14.6.6. The principal receptors to be considered are as follows:

- Users of the public road network;
- Residents living along the access route; and
- Users of the PRoW, bridleway and path network within the Study area.

14.7. Mitigation embedded into the design

14.7.1. This preliminary assessment has been based on the principle that measures have been ‘embedded’ into the design of Rosefield Solar Farm to remove potential likely significant environmental effects as far as practicable, for example by the considered placement of infrastructure.. Embedded (primary) environmental mitigation measures that are considered to be an inherent part of Rosefield Solar Farm are detailed within **Chapter 5: Approach to the EIA**. The embedded mitigation measures relevant to transport and access and the benefits these provide are outlined in **Table 14.3** below.

Table 14.3 – Embedded mitigation measures relevant to transport and access

Embedded mitigation measures relevant to transport and access	Benefit
The proposed access route avoids passing through villages as far as is possible and reduces its potential impact on sensitive receptors.	Removes construction traffic from villages, reducing adverse impacts in sensitive areas.
The Site access junctions are designed to allow for two-way traffic flows and sufficient visibility in all directions.	Ensuring road safety and efficiency for all users.
All HGV traffic for the Battery Energy Storage System (BESS) and northeastern portion of the Site will be routed through the main access and will approach Granborough Road from Quainton Road, removing the need for a constrained 90 degree turn at the junction.	Ensuring road safety and efficiency for all users and reducing the need for intrusive road enhancement works.
Layby works on the Granborough Road to accommodate the temporary increase in traffic associated with the construction phase.	Improving road safety measures and reducing the need for large scale road widening measures.
Bridge crossing and road enhancement works on Snake Lane/Fiddlers Field potentially undertaken by HS2 and/or Buckinghamshire Council.	Improved access and enhanced safety measures for all road users.
Basic traffic management measures including site access signage.	Improving road safety for all users.
A Construction Staff Travel Plan to reduce single occupancy journeys to and from the Site. An Outline Construction Staff Travel Plan will be submitted in support of the DCO application as part of the Outline Construction Traffic Management Plan.	Reduced traffic and delay on study roads.

14.8. Optionality

14.8.1. **Chapter 5: Approach to the EIA** sets out those elements of Rosefield Solar Farm for which optionality is present within the current design and sets out the scenarios assessed for the purpose of this PEIR.

14.8.2. The preliminary design principles as outlined in **Chapter 5: Approach to the EIA** and preliminary parameter plans (**Figures 3.1** to **3.5** in **Volume 2**) set out the reasonable 'worst case scenario' that has been assessed within this chapter. The 'worst case scenario' option in relation to this

preliminary transport and access assessment are associated with the substation and cable routing options and the traffic estimates account for either design option. .This preliminary assessment assumes a worst case scenario and has modelled the peak of construction traffic and its potential impact on the Study area road network.

14.8.3. The use of peak flows, based upon a maximised design, ensures that minor design changes that may occur between the PEIR stage and the submission of the DCO application will not increase the likely significant effects noted in the assessment or have an adverse impact on proposed mitigation measures.

Preliminary assessment assumptions

14.8.4. The derivation of construction traffic is detailed in **Appendix 14.1** in **Volume 3**. The peak of construction in terms of vehicular movements would likely occur in Month 4 of the indicative construction programme and results in 362 daily trips (218 Car/LGV and 144 HGV journeys).

14.8.5. The peak traffic flows have been distributed to the Study area network. The construction phase traffic flows are detailed in **Table 14.5**. These flows have been used in this preliminary assessment.

Table 14.5 – Construction peak period daily traffic flow

Road link	Car & LGV	HGV	Total traffic
A34	11	124	135
M40 North	11	8	19
M40 South	11	8	19
A41	33	140	173
A41 Bicester	109	140	249
A41 West	109	140	249
A41 East	109	5	114
Station Road/Dewes Lane	218	144	362
Snake Lane/Fiddlers Field	218	144	362
Claydon Road	218	144	362
Granborough Road	74	83	157
Please note that rounding errors may occur			

14.9. Approach to the preliminary assessment

14.9.1. In 2023, the Institute of Environmental Management and Assessment (IEMA), published guidelines entitled 'Environmental Assessment of Traffic and Movement' that should be used to characterise the environmental traffic and transport effects (offsite effects) and the assessment of significance of major new developments. The IEMA Guidelines (2023) intend to complement professional judgement and the experience of trained assessors and require consideration of the following:

- Severance;
- Driver delay;
- Pedestrian delay (incorporating delay to all non-motorised users);
- Non-motorised user amenity;
- Fear and intimidation;
- Road safety;
- Road safety audits; and
- Large loads.

Receptor sensitivity

14.9.2. In terms of traffic and transport impacts, the receptors are the users of the roads within the Study area and the locations through which those roads pass.

14.9.3. The IEMA Guidelines (2023) includes guidance on how the sensitivity of receptors should be assessed. Using that as a base, professional judgement has been used to develop a classification of sensitivity for users based on the characteristics of roads and locations. This is summarised in **Table 14.6**. It should be noted that the criteria presented in **Table 14.6** have been augmented from the criteria presented in Appendix D of the EIA Scoping Report to include residential classes as well as the road user classes, thus ensuring a more robust approach to this preliminary assessment.

Table 14.6 – Classification of receptor sensitivity

Sensitivity	Description
High	Where the road is a minor rural road, not constructed to accommodate frequent use by HGVs. Includes roads with traffic control signals, waiting and loading restrictions, traffic calming measures. Where a location is a large rural settlement containing a high number of community and public services and facilities.

Sensitivity	Description
Medium	Where the road is a local A or B class road, capable of regular use by HGV traffic. Includes roads where there is some traffic calming or traffic management measures. Where a location is an intermediate sized rural settlement, containing some community or public facilities and services.
Low	Where the road is Trunk or A-class, constructed to accommodate significant HGV composition. Includes roads with little or no traffic calming or traffic management measures. Where a location is a small rural settlement, few community or public facilities or services.
Negligible	Where roads have no adjacent settlements. Includes new or existing strategic trunk roads that would be little affected by additional traffic and suitable for Abnormal Indivisible Loads, and new strategic trunk road junctions capable of accommodating Abnormal Indivisible Loads. Where a location includes individual dwellings or scattered settlements with no facilities.

14.9.4. Where a road passes through a location, users are considered subject to the highest level of sensitivity defined by either the road or the location characteristics.

Magnitude of change

14.9.5. The magnitude of change has been assessed in accordance with the following rules which are outlined in the IEMA Guidelines (2023), and are used to inform a screening exercise to determine which links within the Study area are to be considered for detailed analysis in the assessment:

- Rule 1: Include highway links where traffic flows are predicted to increase by more than 30% (or where the number of heavy goods vehicles (HGVs) is predicted to increase by more than 30%).
- Rule 2: Include any other specifically sensitive areas where total traffic flows are predicted to increase by 10% or more.

14.9.6. The IEMA Guidelines (2023) identify the key impacts when assessing the magnitude of traffic change from an individual development:

- Severance – the IEMA Guidelines (2023) advises that, *"The Department for Transport has historically set out a range of indicators for determining the significance of severance. Changes in traffic flow of 30%, 60% and 90% are regarded as producing 'slight', 'moderate' and 'substantial' changes in severance respectively. Although these thresholds no longer appear in Department for Transport guidance, they*

have not been superseded by subsequent changes to guidance and are established through planning case law. However, caution needs to be observed when applying these thresholds as very low baseline flows are unlikely to experience severance impacts even with high percentage changes in traffic." (Para 3.16). The Guidelines acknowledge that changes in traffic flows should be used cautiously, stating that *"the assessment of severance should pay full regard to specific local conditions, e.g. sensitivity of adjacent land uses, prevalence of vulnerable people, whether or not crossing facilities are provided, traffic signal settings, etc."* (Para 3.17).

- Driver delay – the IEMA Guidelines (2023) note that these delays are only likely to be *"significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system"* (Para 3.20).
- Pedestrian delay (incorporating delay to all non-motorised users) – the IEMA Guidelines (2023) advises that *"pedestrian delay and severance are closely related effects and can be grouped together. Changes in the volume, composition or speed of traffic may affect the ability of people to cross roads. In general, increases in traffic levels are likely to lead to greater increases in delay. Delays will also depend on the general level of pedestrian activity, visibility and general physical conditions of the development site."* (Para 3.24). Furthermore, the Guidelines advises that *"…it is not considered wise to set down definitive thresholds. Instead it is recommended that the competent traffic and movement expert use their judgement to determine whether pedestrian delay constitutes a significant effect."* (Para 3.26).
- Non-motorised user amenity - the IEMA Guidelines (2023) advises that, *"The 1993 Guidelines suggest that a tentative threshold for judging the significance of changes in pedestrian amenity would be where the traffic flow (or HGV component) is halved or doubled. Although these thresholds no longer appear in Department for Transport guidance, they have not been superseded by subsequent changes to guidance and are established through planning case law."* (Para 3.30).
- Fear and intimidation – there are no commonly agreed thresholds for estimating levels of fear and intimidation from known traffic and physical conditions. However, as the impact is considered to be sensitive to traffic flow, changes in traffic flow of 30%, 60% and 90% are regarded as producing minor, moderate and substantial changes respectively in the IEMA Guidelines (2023) (Para 2.19). As such, this has been used to assess the potential impacts associated with construction activities around fear and intimidation on people near Rosefield Solar Farm.
- Road safety – professional judgement has been used to assess the implications of local circumstances, or factors which may elevate or lessen risks of accidents. In line with the IEMA Guidelines (2023), those areas of collision clusters have been subject to detailed review.

- Road safety audits – It would be proposed to undertake any necessary Road Safety Audits post consent and it is considered that this can be secured via a requirement to the DCO through the Construction Traffic Management Plan.
- Large loads – The movement of the Abnormal Indivisible Loads associated with the construction of Rosefield Solar Farm are being considered, within a separate route survey assessment, which identifies if any physical mitigation measures are required to accommodate the predicted loads.

14.9.7. While not specifically identified, as more vulnerable road users, cyclists are considered in similar terms to pedestrians.

14.9.8. The impacts and levels of magnitude are discussed in **Table 14.7**. The IEMA Guidelines (2023) states that there are useful references within Design Manual for Roads and Bridges that can be used cautiously to augment the assessment methodologies outlined in the Guidelines. Equally, the EIA suite of documents (Design Manual for Roads and Bridges LA 101 to LA 104 inclusive) set out a framework for EIA, some of which can be utilised for an assessment of non-highway/road projects. Therefore, the criteria presented in **Table 14.7** have been informed by Design Manual for Roads and Bridges LA 104: Environmental Assessment and Monitoring.

Table 14.7 – Magnitude of change

Magnitude	Description
Major	These effects are considered to be material in the decision-making process.
Moderate	These effects may be important but are not likely to be material factors in decision making. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a receptor.
Minor	These effects may be raised as local factors. They are unlikely to be critical in the decision-making process but are important in improving the subsequent design of the project.
Negligible	No effects or those that are imperceptible.

Significance of effect

14.9.9. To determine the overall significance of effects, the results from the receptor sensitivity and magnitude of change assessments are correlated and classified using the scale set out below in **Table 14.8**. These criteria have been based on an amalgam of the IEMA Guidelines (2023), Design

Manual for Roads and Bridges LA 104: Environmental Assessment and Monitoring, and professional judgement.

Table 14.8 – Significance criteria

Sensitivity	Magnitude of change			
	Major	**Moderate**	**Minor**	**Negligible**
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

14.9.10. Significance is categorised as **major**, **moderate**, **minor** or **negligible**. Effects judged to be of **major** or **moderate** significance are considered to be **significant** and require additional mitigation. Effects judged to be of **minor** or **negligible** significance are considered **not significant**.

14.9.11. Where an effect could be one of **major/moderate**, **moderate/minor** or **minor/negligible** significance, professional judgement has been used to determine which option should be applicable.

14.9.12. In line with the scoping opinion from PINS, the assessment will only focus on the construction phase, that being the phase with the highest level of traffic generation.

14.9.13. During operation, the Site will be subject to daily operational and maintenance visits, with up to 12 staff travelling to Site via cars or LGV. The average number of trips per day would be less than twelve trips per day, which is the equivalent to traffic impact of between 0.5% and 0.8% between the A41 and the main Site access junction on Claydon Road. This level of traffic is significantly below the established daily variance in traffic flows of 10% that can be normally expected and as such, there is no requirement to undertake an operational (including maintenance) phase assessment.

14.9.14. The decommissioning phase has not been considered within this preliminary assessment for two reasons. The decommissioning phase will result in fewer trips on the network than the construction phase as elements such as the access junctions and section of the access tracks would be retained for future agricultural uses. In addition, the decommissioning phase is too far in the future to accurately predict future traffic flows. To protect future stakeholders it is proposed that a Decommissioning Traffic Management Plan be prepared prior to

decommissioning works commencing, which would be secured via a DCO Requirement.

14.10. Assessment of likely effects (without additional mitigation)

14.10.1. The construction peak period daily traffic flow presented in **Table 14.5** has been compared with the 2028 baseline traffic flows presented in **Table 14.2** to allow a comparison between the baseline results to be made. The increase in traffic volumes is illustrated in percentage increases for each class of vehicle. This is illustrated in **Table 14.9**.

Table 14.9 – Predicted % increase in traffic volume during construction

Road link	Car & LGV	HGV	Total traffic
A34	0.02%	1.45%	0.19%
M40 North	0.01%	0.05%	0.02%
M40 South	0.02%	0.10%	0.03%
A41	0.10%	6.41%	0.51%
A41 Bicester	0.50%	7.18%	1.05%
A41 West	1.13%	5.93%	2.07%
A41 East	1.02%	0.23%	0.87%
Station Road/Dewes Lane	26.01%	56.58%	33.14%
Snake Lane/Fiddlers Field	235.74%	473.17%	294.61%
Claydon Road	17.21%	59.29%	23.98%
Granborough Road	27.45%	101.07%	44.67%
Please note that rounding errors may occur			

14.10.2. The highest total traffic movement increase during construction occurs on Station Road/Dewes Lane, Snake Lane/Fiddlers Field and Granborough Road. This is expected due to the relatively low baseline traffic flow on both roads at present. Claydon Road does not experience a traffic increase in excess of 24% and is therefore below the 30% threshold to trigger Rule 1 of the IEMA Guidelines (2023) (refer to **paragraph 14.9.5**).

14.10.3. None of the other links within the Study area experience total traffic movement increases in excess of 2.1%. These are either at or significantly below the accepted industry standard estimate of daily traffic flow variation of 10%.

14.10.4. It should be noted the construction phase is transitory in nature and the peak of construction activities is short lived, occurring over a relatively short timeframe when taking account of the whole construction programme.

14.10.5. The increase in traffic levels are such that link capacity thresholds would not be exceeded.

14.10.6. Under the IEMA Guidelines (2023) thresholds, a preliminary assessment has been undertaken (refer to **Section 14.12**) on the roads leading from the A41 to the Site access junctions, as these exceed the 30% threshold of Rule 1 (refer to **Section 14.9**).

14.10.7. Taking account of the embedded mitigation measures described within **Chapter 5: Approach to the EIA** and **Section 14.7**, the resultant effects that could be expected will be restricted to the section of access route from the A41 corridor to the Site accesses. These are summarised in **Table 14.10**. It should be noted that the effects relate solely to the peak of construction activities (Month 4), and that the construction period is short lived and the effects transitory in nature.

Table 14.10 – Preliminary assessment of likely significant effects, in the absence of additional mitigation

Receptor	Likely effects	Potential significance	Need for additional mitigation
Users of Station Road/Dewes Lane	Non-Motorised User Amenity	Significant, but temporary effect	Yes
Users of Snake Lane/Fiddlers Field	Severance, Driver Delay, Non-Motorised User Amenity and Fear & Intimidation	Significant, but temporary effect	Yes
Users of Claydon Road	None	Not significant	No
Users of Granborough Road	Severance, Driver Delay, Non-Motorised User Amenity and Fear & Intimidation	Significant, but temporary effect	Yes
PRoW, Bridleway and Path Users within the development areas	Severance, Pedestrian Delay, Non-Motorised User Amenity and Fear & Intimidation	Significant, but temporary effect	Yes

Receptor	Likely effects	Potential significance	Need for additional mitigation
Residents of Station Road/Dewes Lane	None	Not significant	No
Residents of Snake Lane/Fiddlers Field	Driver Delay, Non-Motorised User Amenity and Fear & Intimidation	Significant, but temporary effect	Yes
Residents of Claydon Road	None	Not significant	No

14.11. Additional mitigation

14.11.1. To address the temporary effects associated with the construction phase, the following additional measures are proposed.

Draft Outline Construction Traffic Management Plan (CTMP)

14.11.2. A Draft Outline Construction Traffic Management Plan is provided in **Appendix 14.2** in **Volume 3** that addresses the specific traffic management measures required at the Site and sets out the proposed measures in detail and what how these measures will assist road users and residents. The Draft Outline Construction Traffic Management Plan has been informed by early consultation feedback from residents and stakeholders.

14.11.3. The Draft Outline Construction Traffic Management Plan includes the following proposed measures:

- Proposed construction access route;
- Routes barred for construction traffic;
- Timing for construction traffic on the network;
- The creation of a Traffic Management Group (formed as a subgroup of the Community Liaison Group) to act as a liaison between the Applicant and the local community;
- Contractor selection, including the requirements to adhere to the Considerate Constructors Scheme and Construction Logistics and Community Safety best practice guidance;
- General traffic management requirements;
- Road signage measures;

- HGV vehicle requirements, including identify requirements and data logging;
- A Wear & Tear Agreement with Buckinghamshire Council covering any damages and wear on the road network;
- Outline Construction Staff Travel Plan to facilitate sustainable travel to and from the construction site for staff (note this is presented in **Table 14.3** as embedded (primary) mitigation, but is referenced here as it will be submitted in support of the DCO application as part of the Outline Construction Traffic Management Plan);
- Abnormal Indivisible Load Traffic Management Plan, covering the separate access route for abnormal deliveries;
- Onsite access management proposals;
- Measures to reduce onsite vehicle emissions such as shutting down engines hen vehicles are stationary and the use of low emission vehicles;
- Construction Traffic Management Plan management protocol and complaints process, including response times and commitments; and
- A liaison process with other existing development and/or approved development(s) that may share the access routes.

14.11.4. An Outline Construction Traffic Management Plan will be submitted in support of the DCO application.

14.11.5. It is recognised that it will be necessary to divert PRoWs, either temporarily or permanently, for the construction phase of Rosefield Solar Farm. Within the Outline Construction Traffic Management Plan, consideration will be given to pedestrians, cyclists and horse riders alike due to potential interactions between construction traffic and users of the PRoW, bridleway and path network during the construction phase.

14.11.6. The Principal Contractor should ensure that speed limits are always adhered to by their drivers and associated subcontractors. This is particularly important at crossing points. Advisory speed limit signage will also be installed on approaches to areas where path users may interact with construction traffic.

14.11.7. Signage will be installed across the Site that makes drivers aware of local speed limits and reminding drivers of the potential presence of pedestrians, cyclists and equestrians. This will also be emphasised in weekly toolbox talks for construction staff and delivery drivers.

14.11.8. Users of the PRoWs will be separated from construction traffic using barriers (where permitted and appropriate) which will ensure that safe access across the Site for recreational purposes will be maintained. Crossing points will be provided where required with path users having right of way, and diversions will be provided where necessary. It should be

noted that any necessary temporary diversions (during the construction phase) to the path network will be discussed and agreed with Buckinghamshire Council in further detail.

14.11.9. Appropriate Traffic Signs Manual Chapter 8[16] compliant temporary road signage would be provided to assist at these crossings for the benefit of all users.

14.11.10. The British Horse Society recommendations on the interactions between HGV traffic and horses state that horses are normally nervous of large vehicles, particularly when they do not often meet them. Horses are flighty animals and will run away in panic if really frightened. Riders will do all they can to prevent this but, should it happen, it could cause a serious accident for other road users, as well as for the horse and rider.

14.11.11. The main factors causing fear in horses in this situation are:

- something approaching them, which is unfamiliar and intimidating;
- a large moving object, especially if it is noisy;
- lack of space between the horse and the vehicle;
- the sound of air brakes; and
- anxiety on the part of the rider.

14.11.12. The British Horse Society recommends the following actions that will be included in the Site training for all HGV staff:

- On seeing riders approaching, drivers must slow down and stop, minimising the sound of air brakes, if possible.
- If the horse still shows signs of nervousness while approaching the vehicle, the engine should be shut down (if it is safe to do so).
- The vehicle should not move off until the riders are well clear of the back of the HGV.
- If drivers are wishing to overtake riders, please approach slowly or even stop to give riders time to find a gateway or lay by where they can take refuge and create sufficient space between the horse and the vehicle. Because of the position of their eyes, horses are very aware of things coming up behind them.
- All drivers delivering to the Site must be patient. Riders will be doing their best to reassure their horses while often feeling a high degree of anxiety themselves.

[16] Department for Transport et al, (2009), 'Traffic Signs Manual, Traffic Safety Measures and Signs for Road Works and Temporary Situations'

14.11.13. Discussions with local equestrian groups will be held during the construction phase to keep riders informed of works and activities. These discussions will also allow the contractors to tailor their toolbox talks to specific equestrian issues.

14.12. Assessment of residual effects (with additional mitigation)

14.12.1. Taking account of the proposed embedded and additional mitigation measures described above, it is expected that the transport and access effects would be as detailed in **Table 14.11**, based upon the assessment criteria presented in **Section 14.9**.

Table 14.11 – Preliminary assessment of likely effects, following additional mitigation

Receptor (sensitivity)	Magnitude of change	Residual significance of effect	Effect duration
Users of Station Road/Dewes Lane (**Medium receptor sensitivity**)	Moderate	Minor **Not significant**	Temporary during construction
Users of Snake Lane/Fiddlers Field (**High receptor sensitivity**)	Major	Minor **Not significant**	Temporary during construction
Users of Granborough Road (**High receptor sensitivity**)	Major	Minor **Not significant**	Temporary during construction
PRoW, Bridleway and Path Users within the development areas (**High receptor sensitivity**)	Major	Minor **Not significant**	Temporary during construction
Residents of Snake Lane/Fiddlers Field (**Low receptor sensitivity**)	Moderate	Minor **Not significant**	Temporary during construction

14.13. Opportunities for enhancement

14.13.1. The following proposed enhancement opportunities have currently been identified in relation to traffic and transport:

- Enhancements to Granborough Road in the form of the passing places and road widening, should Buckinghamshire Council agree to the works being permanent; and

- PRoW, bridleway and path enhancements within the Site.

14.13.2. A Wear & Tear Agreement with Buckinghamshire Council is referenced in **Section 14.11** as additional mitigation, covering any damages and wear on the road network. This will also ensure that no significant road deterioration will take place and where repairs are undertaken, they will be left in-situ, which will realise an enhancement benefit.

14.14. Difficulties and uncertainties

14.14.1. The information provided in this PEIR is preliminary and is based on the data available at the time of writing. The final assessment of likely significant effects will be reported in the ES.

14.14.2. The assessment is based upon the worst case preliminary design and construction programme. Changes to these will result in a revised impact that will likely be lower than that predicted in this preliminary assessment. Any such changes however, are unlikely to alter the mitigation proposals.

14.15. Further work required to inform the ES

14.15.1. To form a robust ES, the following work is proposed so that all aspects will be suitably considered:

- An updated assessment, including full details of other existing development and/or approved development(s). This will also include a sensitivity review of the traffic effects of other existing development and/or approved development(s).

15. Water

15.1. Introduction

15.1.1. This chapter presents a preliminary assessment of the likely significant effects arising from the construction, operation (including maintenance) and decommissioning of Rosefield Solar Farm upon the water environment and should be read in conjunction with the following figures and appendix in **Volume 2 and Volume 3 respectively**:

- **Figure 15.1: Flood Zone and Watercourse Mapping;**
- **Figure 15.2: Surface Water Flood Mapping;**
- **Figure 15.3: Water Framework Directive and Designated Areas;** and
- **Appendix 15.1: Flood Depth Analysis.**

15.1.2. This preliminary assessment has considered flood risk from all sources (including groundwater), but water quality to surface waterbodies only. Groundwater is considered in **Chapter 10: Land, Soil and Groundwater**.

15.2. Stakeholder engagement

15.2.1. **Table 15.1** provides a summary of the engagement undertaken to date to inform this preliminary assessment.

Table 15.1 – Engagement undertaken to date

Stakeholder	Date and method	Key matters discussed
Environment Agency	06 February 2024 – Meeting (online video conference call)	Informed the Environment Agency that some solar modules are likely to be located within Flood Zone 2 and Flood Zone 3. This was accepted in principle, subject to further discussion on the design details. Confirmation was also provided that firewater drainage will be considered as part of the assessment of the BESS.
Buckinghamshire Council – Lead Local Flood Authority	01 May 2024 – Email	Buckinghamshire Council (the Lead Local Flood Authority) provided information pertaining to the accepted drainage principles for solar farms, with case

Stakeholder	Date and method	Key matters discussed
		study applications provided for reference.
Buckinghamshire Council – Lead Local Flood Authority	07 May 2024 – Meeting (online video conference call)	Outlined the requirements for surface water drainage design and the need to consider overland flood flow routes through the Site.

15.3. Legislative framework, planning policy and guidance

15.3.1. The preliminary assessment has been undertaken with regard to the following legislation, planning policy and guidance.

Legislation

- Land Drainage Act 1991[1];
- The Water Framework Directive 2000/60/EC[2], which is transposed into legislation for England via The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017[3];
- Flood and Water Management Act 2010[4];
- Water Act 2003[5];
- Water Resources Act 1991[6];
- Water Act 2014[7];

[1] Land Drainage Act 1991. Available online https://www.legislation.gov.uk/ukpga/1991/59/contents
[2] Water Framework Directive 2000/60/EC. Available online: [redacted]
[3] The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. Available online: https://www.legislation.gov.uk/uksi/2017/407/contents/made
[4] Flood and Water Management Act 2010. Available online: https://www.legislation.gov.uk/ukpga/2010/29/contents
[5] Water Act 2003. Available online: https://www.legislation.gov.uk/ukpga/2003/37/contents
[6] Water Resources Act 1991. Available online: https://www.legislation.gov.uk/ukpga/1991/57/contents
[7] Water Act 2014. Available online: https://www.legislation.gov.uk/ukpga/2014/21/contents/enacted

- Water Industry Act 1991[8];
- The Environmental Permitting (England and Wales) Regulations 2016[9];
- Control of Pollution (Oil Storage) (England) Regulations 2001[10];
- The Flood Directive 2007/60/EC[11], which is transposed into legislation for England via the Retained EU Law (Revocation and Reform) Act 2023[12]; and
- The Environment Act 2021[13].

National planning policy

- Overarching National Policy Statement for Energy (NPS EN-1) (2023)[14] - Section 5.8 'Flood Risk' outlines the requirement to consider an approach to flood risk and flood risk management (as summarised in Paragraph 5.8.7), and the requirements for surface water drainage (as summarised in Paragraph 5.8.27);
- National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (2023)[15] – Section 2.10 gives specific consideration to solar development, specifically in relation to the layout and design which should consider the mitigation of flood risk (Paragraph 2.10.60). The Flood Risk Assessment shall consider the impact of drainage (as per Paragraph 2.10.84) and value delivered by drainage and flood attenuation (as per Paragraph 2.10.154);

[8] Water Industry Act 1991. Available online: https://www.legislation.gov.uk/ukpga/1991/56/contents
[9] The Environmental Permitting (England and Wales) Regulations 2016. Available online: https://www.legislation.gov.uk/uksi/2016/1154/contents/made
[10] Control of Pollution (Oil Storage) (England) Regulations 2001. Available online: https://www.legislation.gov.uk/uksi/2001/2954/contents
[11] The Flood Directive 2007/60/EC. Available online: https://www.legislation.gov.uk/eudr/2007/60
[12] Retained EU Law (Revocation and Reform) Act 2023. Available online: https://www.legislation.gov.uk/ukpga/2023/28/contents
[13] The Environment Act 2021. Available online: https://www.legislation.gov.uk/ukpga/2021/30/contents
[14] Department for Energy Security and Net Zero. (2023). Overarching National Policy Statement for Energy (EN-1). Available online: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1
[15] Department for Energy Security and Net Zero (2023). National Policy Statement for Renewable Energy Infrastructure (EN-3). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3

- National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (2023)[16] – Section 2.3 details issues relating climate change and outlines the considerations required with relation to flood risk;
- National Planning Policy Framework (NPPF) (2023)[17] - Section 14 'Meeting the challenge of climate change, flooding and coastal change' sets out the criteria for development and flood risk by stating that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere; and
- Flood Risk and Coastal Change National Planning Practice Guidance (Department for Levelling Up, Housing and Communities, 2022)[18].

Local planning policy

- Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021)[19], specifically Policy I4 'Flooding'; and
- Local Plan for Buckinghamshire: Draft vision and Objectives for 2040[20], with particular reference to Objective 2: 'Mitigating/adapting to climate change' and Objective 6: 'Infrastructure'.

Guidance

- Planning Inspectorate - Advice Note Eighteen: The Water Framework Directive (June 2017)[21]; and

[16] Department for Energy Security and Net Zero (2023). National Policy Statement for Electricity Networks Infrastructure (EN-5). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5
[17] Ministry of Housing, Communities and Local Government and Department for Levelling Up, Housing and Communities. (2023). National Planning Policy Framework. Available online: https://www.gov.uk/government/publications/national-planning-policy-framework--2
[18] Ministry of Housing, Communities and Local Government and Department for Levelling Up, Housing and Communities (2022) Flood Risk and Coastal Change Planning Practice Guidance. Available online: https://www.gov.uk/guidance/flood-risk-and-coastal-change
[19] Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021). Available online: [redacted]
[20] Buckinghamshire Council, The Local Plan for Buckinghamshire - Draft vision and objectives (2023). Available online: [redacted]
[21] Planning Inspectorate - Advice Note Eighteen: The Water Framework Directive (version 1, June 2017). Available online: Advice Note Eighteen (www.gov.uk)

- Flood Risk Assessments: climate change allowances (Environment Agency, 2022)[22].

15.4. Study area

15.4.1. For the purposes of this preliminary assessment, the Site and a 1 km buffer have been considered as the Study area to identify hydrological receptors that could be impacted by the construction, operation (including maintenance) and decommissioning of Rosefield Solar Farm. A 1 km buffer is considered appropriate for water environment assessments, based on professional judgment. This is considered a sufficient distance to enable the deposition of silts in overland flows and dilution of any concentrated pollutants so that waterbodies at a greater distance than 1 km would not be at significant risk of being affected.

15.4.2. The Study area is depicted within **Figure 15.1** in **Volume 2** to show the areas of Flood Zone 2 and Flood Zone 3 and watercourses which have been considered as part of this preliminary assessment. The Study area is depicted within **Figure 15.2** in **Volume 2** to show the surface water flooding and overland flow paths which have been considered as part of this preliminary assessment. Finally, the Study area is depicted within **Figure 15.3** in **Volume 2** to show the Water Framework Directive waterbodies which have been considered as part of this preliminary assessment.

15.5. Establishing baseline conditions

15.5.1. An initial desk-based hydrology study has been undertaken to inform this preliminary assessment, which has included a review of existing watercourses, water quality, surface water drainage/flood risk and areas prone to fluvial flooding as identified on the Flood Map for Planning[23].The watercourses and flood zones from the Flood Map for Planning are shown in **Figure 15.1** in **Volume 2**.

15.5.2. Initial baseline information on the physical environment has been collected from the following sources:

- Flood Map for Planning;
- Risk of Flooding from Surface Water maps[24];

[22] Environment Agency (2022). Flood Risk Assessments: climate change allowances. Available online: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances
[23] Environment Agency. Flood Map for Planning. Available online: Flood map for planning - GOV.UK (flood-map-for-planning.service.gov.uk)
[24] Environment Agency. Risk of Flooding from Surface Water Extents. Available online: Risk of flooding from surface water extent (data.gov.uk)

- The British Geological Survey (BGS) Geology Map;
- Defra MAGIC Map[25] (Drinking Water Safeguard Zone (Surface Water), Sites of Special Scientific Interest; Special Areas of Conservation, Special Protection Areas);
- Soilscapes[26];
- Statutory Main River Map[27];
- Catchment Data Explorer: Water environment and Water Framework Directive classifications[28];
- 1 m LiDAR Digital Terrain Model; and
- Ordnance Survey Mapping.

15.5.3. Additionally, an assessment as provided in **Appendix 15.1** in **Volume 3** outlines the estimated flood depths for a 1% annual exceedance probability event (1 in 100 year return period) within Parcel 3.

15.6. Environmental baseline

Site description

15.6.1. The Site is currently agricultural land, which is predominantly a mixture of arable land and pasture.

15.6.2. Within the Site, land is understood to drain as overland runoff towards the areas of localised lowest topographies and/or naturally infiltrate where the ground conditions allow. There are a series of drains/watercourses identified on Ordnance Survey mapping across the Site; these are predominantly unnamed headwaters and are classified as Ordinary Watercourses (those not designated by the Environment Agency as Main Rivers). The Ordinary Watercourses within the Site and the Study area fall outside of any Internal Drainage Board districts.

Watercourses

15.6.3. The single largest Ordinary Watercourse network close to the Site is located on the eastern boundary of Parcel 3, which flows north/north eastwards and feeds the headwaters of Claydon Brook Tributary located

[25] Department for Environment, Food & Rural Affairs. MAGIC Map (2023). Available online: MAGIC (defra.gov.uk)
[26] Cranfield University LandIS Scoilscapes Viewer (2024). Available Online: [redacted]
[27] Environment Agency. Statutory Main River Map. Available online: [redacted]
[28] Environment Agency. Catchment Data Explorer. Available online: Catchment Data Explorer (https://environment.data.gov.uk/catchment-planning)

on the eastern boundary of Parcel 3 and Claydon Brook located immediately north of Parcel 3. Watercourses of interest within the Study area are marked in **Figure 15.1** in **Volume 2**.

15.6.4. The Ordinary Watercourse identified as Muxwell Brook rises adjacent to the south of Parcel 2 (north of Field D29) and intersects through Parcel 1a (north of Field C1 and C2).

15.6.5. From the Environment Agency's Main River mapping, the nearest Main River watercourse is the River Ray, located approximately 200 m to the south of Parcel 2 and within the Study area. The Site boundary of the cable route corridor intersects this river.

15.6.6. Within the Study area, an unnamed tributary of the River Ray is located 400 m to the southwest of Parcel 1a and is also designated as a Main River. This is fed by Muxwell Brook which originates from within the Site.

Fluvial flood risk

15.6.7. With reference to the Flood Map for Planning (reproduced in **Figure 15.1** in **Volume 2**), the vast majority of the Site is Flood Zone 1. There are Flood Zone 2 and Flood Zone 3 areas located at the northeastern boundary of the Site. This means that several fields of Parcel 3 are partially within the fluvial flood zones (Fields E10, E11, E20, E21 and E23). The flood zones are limited to the lower topographical areas of these fields, which slope down towards the adjacent Ordinary Watercourse, Claydon Brook Tributary, on the eastern boundary of the Site.

15.6.8. Following consultation with the Environment Agency, it is understood that this flood zone is derived from a nationalised modelling data set (named JFLOW) and as a result there are no model-specific flood water levels available for this area of flood zone. However, as per the assessment described below, a flood water level has been estimated from the delineation of the flood extents against topography.

15.6.9. With reference to the flood depth assessment presented in **Appendix 10.1** in **Volume 3**, the assessment concludes maximum flood depths of up to 1.0 m could be anticipated towards the north of the Parcel 3 within the areas of Flood Zone 3, close to the National Grid East Claydon Substation and at the confluence of Claydon Brook and the Tributary. Towards the south of Parcel 3 within Flood Zone 3 it is anticipated flood depths could reach a maximum of 0.5 m.

15.6.10. The Flood Map for Planning also identifies a limited encroachment of Flood Zone 3 at the south of the Site against the boundary of Parcel 1a (Field C1). Given the limited encroachment into this area of Flood Zone 3, there is a limited associated risk and this has therefore not been considered any further in the assessment of flood depths; additionally, no Solar PV modules, BESS or Satellite Collector Compounds are proposed within Parcel 1a. There are some areas of flood zone south of Parcel 2,

located within the Study area. Given the distance from the Site, these flood zone areas have not been considered any further as they will not be affected by Rosefield Solar Farm.

Surface water flood risk

15.6.11. With reference to the Risk of Flooding from Surface Water Extent mapping (reproduced in **Figure 15.2** in **Volume 2**), there are several overland flow routes identified across the Site. Generally, these overland flow routes are attributable to localised topographical depressions, some of which are indicative of minor Ordinary Watercourses, drains and headwaters.

15.6.12. The flow pathways shown on the Risk of Surface Water Extents mapping shows that there are several watershed catchments across the Site and Study area. Runoff from Parcel 2 and Parcel 3 contribute to the Claydon Brook Tributary watershed catchment, draining in a north easterly direction. The north of Parcel 1, and a limited extent of the north of Parcel 2, contribute to the north westerly flowing watershed catchment that also flows into the Claydon Brook/Padbury Brook catchment. The south of Parcel 1, Parcel 1a and Parcel 2 contribute to southern watershed catchments. This arrangement is indicative of the Site being relatively high within the local watershed catchments in topographical terms.

15.6.13. One of the areas of greatest surface water flooding extents is attributable to the Claydon Brook Tributary at the eastern boundary of Parcel 3 (Fields E10, E11, E20, E21 and E23), and the upslope overland tributaries of the watercourse which extents southwards to Parcel 2 (particularly Fields D7, D8, D9, D10, D15, D16, D18 and D19). The mapping extents indicate these areas are calculated as having a 3.3% Annual Exceedance Probability (AEP) (1 in 30 year return period) of flooding.

15.6.14. Several fields within Parcel 1 are identified as having areas of surface water flood risk, including Fields B1, B2, B3, B7, B13, B14, B16, B18, B20, B21, B22, B23 (north and south), although generally only relatively small areas of the fields are affected. The mapping extents indicate that these areas are calculated as having a 1% AEP (1 in 100 year return period) chance of flooding. Areas at risk of more frequent (3.3% AEP or 1 in 30 year return period) flooding are limited to the boundary within Parcel 1, specifically limited areas close to the eastern boundary of Fields B20, B23 (north and south), B16 and B22 (centrally). Field B18 has an isolated area of 1% AEP and 3.3% AEP chance of flooding centrally indicating a low spot within this field.

15.6.15. Lastly, mapping identifies surface water flood risk through Parcel 1a (western and northern area of Field C1 and extreme northern area of Field C2) associated with Muxwell Brook. The mapping extents indicate that these areas are calculated as having a 1% AEP and 3.3% AEP chance of flooding.

15.6.16. More broadly, the remaining surface water flood extents across the Site appear to be relatively narrow flow paths with only limited flood risk to the Site identified. Overland flow paths continue through the Study area to reach higher order watercourses.

15.6.17. In the baseline situation, whilst some areas of flood risk have been identified, a review of the above information concludes that flood risk across the Site and Study area is generally focused within localised and specific areas, and the Site is predominately classified as being at a very low to low risk from flooding.

Water quality

15.6.18. The Drinking Water Safeguard Zone (Surface Water) indicates the Site and Study area are within these designated areas. The safeguard areas identify areas “at risk” of failing the drinking water protection objectives of the Water Environment (Water Framework Directive) Regulations 2017. Further analysis of the safeguard zones indicates the Site is within two Surface Water Safeguard Zones Actions Plans, as outlined below.

15.6.19. The southern area of the Site is within the Lower Thames (Cookham-Egham-Teddington) Drinking Water Protected Area (safeguard zone identification number SWSGZ4016). In summary, the catchment is at risk from Carbetamide (pesticide), Metaldehyde (pesticide), and Propyzamide (pesticide), with those chemicals under consideration being Carbendazim (pesticide), Flufenacet (pesticide), MCPA (pesticide) and Mecoprop (pesticide). National and local initiatives are in place or planned to raise awareness and to work with pesticide users and landowners to reduce the risk of pesticides and nutrients reaching watercourses. Some of these initiatives are targeted specifically at controlling pesticide use, whereas others are more generic and aim to encourage good agricultural practice.

15.6.20. The northern area of the Site is within the River Great Ouse including Grafham Water Drinking Water Protection Area (safeguard zone identification number SWSGZ1012). In summary, the catchment is at risk from Carbetamide (pesticide), Metaldehyde (pesticide), Propyzamide (pesticide) and Quimerac (pesticide). The release of the pesticides and herbicides are outlined in the Surface Water Safeguard Zones Action Plan[29] as being at most significant during the application of the pesticide, with later releases possible during its manufacture, transportation and storage. The plan notes that typical pathways are from fields as diffuse pollution resulting from the movement of soil to drains; this can arise from flooding, surface water runoff and heavy rainfall. It is noted that these flow

[29] Environment Agency, Surface Water Safeguard Zones Action Plan: River Great Ouse including Grafham Water, October 2022. Available at: https://environment.data.gov.uk/farmers/

paths can be influenced by the linear depressions associated with agricultural practices.

Water framework directive waterbodies

15.6.21. Water Framework Directive waterbodies are identified using the online Catchment Data Explorer map (reproduced in **Figure 15.3** in **Volume 2**) The mapping shows a total of four classified waterbodies within the Study area. These are outlined below with a summary of the existing baseline conditions of the watercourses for Cycle 3 (2019 and 2022 classifications).

15.6.22. The nearest Water Framework Directive waterbody to the Site is Claydon Brook Tributary located along the eastern boundary of Parcel 3. The length of designated watercourses is relatively short at a 1.6 km channel reach. The watercourse is given a hydromorphological designation of heavily modified. The watercourse is given a moderate ecological status, with the “Reasons For Not Achieving Good” status generally categorised as agricultural and land management.

15.6.23. The second Water Framework Directive waterbody is Claydon Brook, which is located at the northern extent of Parcel 3. Given the 15.6 km length of the watercourse, only the most downstream extent of the watercourses comes within the Study area and therefore the Site generally has a minimal contribution to the watershed catchment of this watercourse. The watercourse is given a hydromorphological designation of heavily modified. The watercourse is given a moderate ecological status, with the “Reasons For Not Achieving Good” status generally categorised as agricultural and land management and the water industry.

15.6.24. The third Water Framework Directive waterbody is Claydon Brook DS Granborough which intersects within the Site boundary at the north of Parcel 3 and flows north-westwards out of the Study area. The watercourse begins at the confluence of Claydon Brook Tributary and Claydon Brook. The watercourse is given a hydromorphological designation of heavily modified. The watercourse is given a moderate ecological status, with the “Reasons For Not Achieving Good” status generally categorised as agricultural and land management and the water industry.

15.6.25. Lastly, the fourth Water Framework Directive waterbody is Ray and tributaries North East of Grendon Underwood, which is also classified as a Main River. The watercourse is predominately within the Study area, though the Site boundary of the cable route corridor south of the Site intersects the watercourse. The watercourse is not designated artificial or heavily modified. The watercourse is given a moderate ecological status, with the “Reasons For Not Achieving Good” status generally categorised as agricultural and land management and the water industry.

15.6.26. In the baseline situation it is likely that the watercourses within the Study area would be subject to limited inputs of pollutants, particularly nutrients

and metals, associated with farming activities, urban runoff and sewer company discharges. As the classified watercourses within the Study area are of 'moderate' overall quality, this suggests that these baseline sources of pollution have not significantly impacted water quality within the catchments under consideration.

Designated sites potentially vulnerable in relation to their hydrological function

15.6.27. There are no Sites of Special Scientific Interest, Special Areas of Conservation, Ramsar sites or Special Protection Areas within the Site boundary.

15.6.28. As shown in **Figure 15.3** in **Volume 2**, there are two Sites of Special Scientific Interest outside the Site boundary but within the Study area. Sheephouse Wood is located immediately outside of the south boundary of Parcel 1 and west of Parcel 1 and Finemere Wood is located immediately outside of the south boundary of Parcel 2.

15.6.29. Neither site is potentially vulnerable in relation to its hydrological function and therefore these sites are not considered further within this preliminary assessment.

Future baseline

15.6.30. With regards to flood risk, it is generally accepted by climate scientists that climate change will cause UK weather to become milder and wetter during the winters. For example, within the Upper and Bedford Ouse Management Catchment, which Claydon Brook is within, the current guidelines for peak rainfall allowance increases suggest between a 25% and 40% increase in peak rainfall for a 1% annual exceedance rainfall event by the 2070s[30]. The current guidelines for peak river flow allowances within this catchment are increases between 19% to 58% by the year 2080[31].

15.6.31. The implications of the climate change allowances suggest that the future baseline of flood risk within the Site may see an exacerbation of flood extents and flood depths in areas where there is already shown to be flood risk. However, based on professional judgement, the 1% AEP event (fluvial Flood Zone 3) with the inclusion of climate change rarely exceeds the extents and depths represented by the 0.1% AEP event (fluvial Flood Zone 2).

[30] Defra. Climate change allowances for peak rainfall in England. Available online: Climate Change Allowances (data.gov.uk)
[31] Defra. Climate change allowances for peak river flow in England. Available online: Climate Change Allowances (data.gov.uk)

15.6.32. To determine the impacts of climate change on future flood risk at the Site to any further degree of certainty, a flood modelling exercise using the appropriate climate change allowances would be required. The need (or otherwise) for such modelling will be discussed with the Environment Agency and Buckinghamshire Council (being the Lead Local Flood Authority), and if required will be included to inform the ES.

15.6.33. The future baseline of water quality is unlikely to change from the existing baseline. Assuming no changes in agricultural practices and the water industry there is no reason to suggest that water quality will change.

15.7. Mitigation embedded into the design

15.7.1. This preliminary assessment has been based on the principle that measures have been 'embedded' into the design of Rosefield Solar Farm to remove potential likely significant effects as far as practicable, for example by the considered placement of infrastructure. Embedded (primary) environmental mitigation measures that are considered to be an inherent part of Rosefield Solar Farm are detailed within **Chapter 5: Approach to the EIA**.

15.7.2. There is an emphasis on the location and siting of components of Rosefield Solar Farm so reference is made to **Figure 1.2: Zonal Masterplan** in **Volume 2** throughout.

15.7.3. The embedded mitigation measures relevant to water and the benefits these provide are outlined in **Table 15.2** below.

Table 15.2 – Embedded mitigation measures relevant to water

Embedded mitigation measures relevant to water	Benefit
Panel design and panel height of Solar PV modules within Flood Zone 3	Where Solar PV modules are proposed within Flood Zone 3, the design of the arrays would enable the panels to sit above the flood water level and only the supporting structure of the panel would be below the flood water level. This will mitigate against the potential damage caused by flooding. Of additional note, the Solar PV modules would not require ground raising, therefore any Solar PV modules within Flood Zone 3 will not lead to a loss of floodplain. Panel supports below the flood level are considered to displace a negligible volume of flood water (subject to confirmation from the Environment Agency).

Embedded mitigation measures relevant to water	Benefit
Solar PV modules design inclusion of a rainwater gap	The proposed design allows for rainwater to drain into the spacing between rows of panel arrays. This ensures the runoff from the Site would not increase as a result of the panels. This is accepted as per NPS EN-3 Paragraph 2.10.84; 'As solar PV panels will drain to the existing ground, the impact will not, in general, be significant.'
Siting of: Satellite Collector Compounds, Main Collector Compound, Rosefield Substation and BESS outside of Flood Zone 2 and Flood Zone 3	By proposing to place these compounds and structures outside of Flood Zone 2 and Flood Zone 3 (for both siting scenarios), the likelihood of damage from fluvial flooding is reduced. By ensuring these compounds remain outside of flood zones means there will be no loss of floodplain and therefore no requirement to provide floodplain compensation. The development extents are shown in **Figure 15.1** in **Volume 2**, where the eastern boundary of development extents are defined by the outline of Flood Zones 2 and 3, and therefore the compounds or BESS do not extend into Flood Zones 2 and 3.
Inclusion of a formalised surface water drainage strategy for; Satellite Collector Compounds, Main Collector Compound, Rosefield Substation and BESS	A formalised surface water drainage system for these areas of hardstanding will be designed for the operational (including maintenance) phase. This would ensure surface water runoff volumes and water quality leaving the compounds can be controlled and managed. The inclusion of restricted discharge rates to pre-development greenfield runoff rates will ensure that there is no exacerbation of flood risk on or off-site as a result of Rosefield Solar Farm. The drainage strategy will be designed to ensure the water quality of surface water drainage discharged from Site is of acceptable standards. A temporary surface water drainage strategy is required for the construction and decommissioning stages to ensure no temporary increase in surface water runoff in the intermediatory stages where there may be an increase in impermeable hardstanding but

Embedded mitigation measures relevant to water	Benefit
	no permanent functioning or online surface water drainage infrastructure.
Inclusion of fire water runoff drainage provisions for BESS	It is anticipated that Rosefield Solar Farm would include the provision of fire water runoff storage within the Site to ensure that any contaminated surface water runoff does not enter the wider environment in the unlikely event of a fire. The drainage designs will follow the appropriate best practice guidance.
Minimum offset of least 10 m either side of Main Rivers, and 6 m from ditches and ordinary watercourses, to all fence lines within Rosefield Solar Farm. Where crossing points are required over Main Rivers or ordinary watercourses, these will be designed to minimise effects on floodplain and any biodiversity interest associated with the watercourse.	Rosefield Solar Farm will factor in an offset from watercourses. An offset from watercourses will reduce the impacts that can be associated with construction and decommissioning activities. During the operational (including maintenance) phase, the offset will ensure a reduced flood risk to Rosefield Solar Farm.

15.8. Optionality

15.8.1. **Chapter 5: Approach to the EIA** sets out those elements of Rosefield Solar Farm for which optionality is present within the current design and sets out the scenarios assessed for the purpose of this PEIR.

15.8.2. The preliminary design principles as outlined in **Chapter 5: Approach to the EIA** and preliminary parameter plans (**Figures 3.1** to **3.5** in **Volume 2**) set out the reasonable 'worst case scenario' that has been assessed within this chapter. The 'worst case scenario' options in relation to this preliminary water assessment are described in **Table 15.3** below.

Table 15.3 – Optionality scenarios assessed

Project element	Scenario assessed for this preliminary assessment
Solar PV modules	The indicative area for Solar PV modules is shown on the proposed Zonal Masterplan in **Figure 1.2** in **Volume 2**.

Project element	Scenario assessed for this preliminary assessment
	The worst-case extent of Solar PV modules have been assessed, including where Solar PV modules are proposed within Flood Zone 3.
Balance of Solar System	This preliminary assessment assumes the use of string inverters as this is considered to be the worst case as these will be placed underneath Solar PV modules including those modules proposed within the extents of Flood Zone 3.
Satellite Collector Compounds	There are five fields that are considered suitable for Satellite Collector Compounds, as shown on the proposed Zonal Masterplan in **Figure 1.2** in **Volume 2** (Fields B10, B23, D8, D9 and D17). All possible fields are outside of Flood Zone 2 and Flood Zone 3 and are therefore all assumed to be equal negligible fluvial flood risk.
Main Collector Compound	All possible fields considered suitable for the Main Collector Compound are outside of Flood Zone 2 and Flood Zone 3 and are therefore all assumed to be equal negligible fluvial flood risk.
BESS	There are two scenarios outlined for the proposed location of the BESS in **Chapter 5: Approach to the EIA**. The proposed BESS are within Field D8, D9 and E23 for both scenarios. Additionally for both scenarios, the proposed BESS development extents show that BESS units will be located outside of Flood Zone 2 and Flood Zone 3. For the purpose of this preliminary assessment, Scenario 1 is considered the worst case scenario due to the placement of the BESS in Field E11 closest to the Flood Zone 2 and Flood Zone 3.
Rosefield Substation	There are two scenarios outlined for the proposed location of the Rosefield Substation in **Chapter 5: Approach to the EIA**. Rosefield Substation will either be in Field E11 for Scenario 1, or the predominately northern area of Field E23 for Scenario 2. For the purpose of this preliminary assessment, Scenario 1 is considered the worst case scenario due to the placement of Rosefield Substation in Field E11 closest to the Flood Zone 2 and Flood Zone 3.
Construction Compounds	Potential locations for the proposed Construction Compounds are outlined in **Figure 3.6** in **Volume 2**. The Construction Compounds, will remain outside of Flood

Project element	Scenario assessed for this preliminary assessment
	Zone 2 and Flood Zone 3. Given the proximity to the Flood Zones, a Satellite Compound in Field E21 and a Construction Compound in Field E20 is considered to be the reasonable worst case scenario.
Cable Route	Cable Route options A and B, as outlined in **Figure 3.2** in **Volume 2**, do not cross Flood Zone 2 or Flood Zone 3, nor do they appear to cross any significant watercourses along the route. Given the negligible difference between the routes with regards to the sensitivity of the water environment, Option B has been considered the reasonable worst case option in line with **Chapter 5: Approach to the EIA**.

Preliminary assessment assumptions

15.8.3. For the purposes of this preliminary assessment, it has been assumed that Rosefield Solar Farm will be developed in line with the proposed Zonal Masterplan (**Figure 1.2** in **Volume 2**) and that the Satellite Collector Compounds, Main Collector Compound, Rosefield Substation and BESS will remain outside of Flood Zone 2 and Flood Zone 3.

15.8.4. It is assumed that the Solar PV modules will be of a design that will facilitate flooding below the panels at no detriment to the structure holding the panels off the ground. It is assumed that the panel design will allow for the panels to be raised above the flood water level. Only flood water level estimates can be made at this stage, based on the delineated levels provided in **Appendix 15.1** in **Volume 3**. The flood water level is subject to change if further flood modelling studies are undertaken.

15.8.5. It has been assumed that following the cessation of agricultural activities within the areas of Rosefield Solar Farm, vegetation cover will be established particularly within the areas of Solar PV modules, as opposed to the current scenario of periodic bare ground following crop harvests.

15.9. Approach to the preliminary assessment

15.9.1. The preliminary assessment of likely significant effects for water has taken into account the sensitivity of the receptor and the magnitude of the impact on that receptor. The stages of this assessment are as outlined below.

15.9.2. Criteria for determining the sensitivity of the receptor is based on professional judgement (in the absence of specific industry recognised guidance) and from the sources of information outlined for the preliminary assessment of the baseline conditions in **Section 15.6**. The sensitivity of the receptor has been defined to range from ‘high’ to ‘negligible’. The

criteria and examples of designations or circumstances that are required to evidence the sensitivity selection are set out in **Table 15.4**.

15.9.3. The criteria used to assess the magnitude of impact are outlined in **Table 15.5**. The allocation of the level of magnitude is identified through the consideration and application of professional judgement and the preliminary assessment of the supporting evidence.

15.9.4. The determination of the significance of effect is achieved using the matrix presented in **Table 15.6**. It should be noted that effects can either be beneficial or adverse.

Table 15.4 – Criteria for determining the sensitivity of receptor

Sensitivity of receptor	Criteria guide
High	The receptor has low ability to absorb change without fundamentally altering its present character, is of high environmental value, or of national importance. In terms of hydrological receptors, this relates to: • A watercourse of National importance; • Areas of Flood Zone 3 or at a high risk of surface water [or other forms of] flood risk; • Water Framework Directive recorded watercourse achieving 'Good' or targeted as 'Good' status (including immediately downstream watercourses); • Regional sewer or water supply networks; • A flood plain or defence protecting between 1 and 100 residential properties or industrial premises from flooding; and • Sites of Special Scientific Interest (SSSI), Ramsar sites, Special Protected Areas (SPAs) and Special Areas of Conservation (SACs) which are potentially vulnerable in relation to their hydrological function.
Medium	The receptor: has moderate capacity to absorb change without significantly altering its present character; has some environmental value; and is of regional importance. In terms of hydrological receptors this relates to: • A watercourse of Regional importance; • Areas of Flood Zone 2 or medium surface water flood risk; • Water Framework Directive recorded watercourse achieving 'Moderate' or targeted as 'Moderate' status (including immediately downstream watercourses);

Sensitivity of receptor	Criteria guide
	• Local sewer or water supply networks.
Low	The receptor is: tolerant of change without detriment to its character; of low environmental value; of local importance. In terms of hydrological receptors this relates to: • A watercourse of Local importance; • Areas of Flood Zone 1 or low surface water flood risk; • Water Framework Directive recorded watercourse achieving 'Poor' or targeted as 'Poor' status (including immediately downstream watercourses); and • On-site sewer or water supply networks.

Table 15.5 – Criteria for determining the magnitude of impact

Magnitude of impact	Criteria guide
High	Total loss or major alteration to key elements or features of the baseline conditions to the extent that post-development character or composition of baseline conditions will be fundamentally changed. (E.g. large increase or decrease in peak flood level, significant deterioration or improvement of water quality).
Medium	Loss or alteration to one or more key elements or features of the baseline conditions to the extent that post-development character or composition of the baseline conditions will be materially changed. (E.g. moderate increase or decrease in peak flood level, moderate deterioration or improvement of water quality).
Low	Minor shift away from baseline conditions. Changes arising will be detectable but not material; the underlying character or composition of the baseline conditions will be similar to the pre-development situation. (E.g. slight increase or decrease in peak flood level, slight deterioration or improvement of water quality).
Negligible	Very little change from baseline conditions. Change is barely distinguishable, approximating to a 'no change' situation. (E.g. no discernible effects on hydrological elements (neither beneficial nor adverse).

Table 15.6 – Criteria matrix for determining significance of effect

Magnitude of impact	Sensitivity		
	High	Medium	Low
High	Major	Major/Moderate	Moderate/Minor
Medium	Major/Moderate	Moderate	Minor
Low	Moderate/Minor	Minor	Minor/Negligible
Negligible	Negligible	Negligible	Negligible

15.9.5. The terms used within **Table 15.6** are defined as follows:

- Major adverse/beneficial effect: where the development will cause significant improvement (or deterioration) to the existing environment.
- Moderate adverse/beneficial effect: where the development will cause noticeable improvement (or deterioration) to the existing environment.
- Minor adverse/beneficial effect: where the development will cause perceptible improvement (or deterioration) to the existing environment.
- Negligible: no discernible improvement or deterioration to the existing environment.

15.9.6. For the purposes of this preliminary assessment, moderate or major beneficial/adverse effects are deemed to be significant. Minor beneficial/adverse or negligible effects are deemed to be not significant.

15.9.7. Where the significance matrix indicates a range for the effect significance (e.g. 'moderate/minor'), professional judgement can be applied to select one option (which would be justified by evidence, as appropriate) or an effect significance range can be applied. If a significance of effect is assigned as 'moderate/minor', this would be considered significant unless further information could be provided to downgrade the significance effect to 'minor'.

15.10. Assessment of likely effects (without additional mitigation)

15.10.1. This section considers the effects that may arise during the construction, operation (including maintenance) and decommissioning phases of Rosefield Solar Farm in the absence of additional mitigation, taking into account the above embedded mitigation measures outlined in **Table 15.2** and assessing the reasonable worst case scenarios as outlined in **Table 15.3**.

Construction and decommissioning phases

15.10.2. With regards to fluvial flood risk, as the Construction Compounds, Satellite Collector Compounds, Main Collector Compound, Rosefield Substation Compound and BESS are all to be located within Flood Zone 1 and are therefore outside of Flood Zone 2 and Flood Zone 3, these components will have negligible impacts on flood risk during the construction and decommissioning phases for both scenarios.

15.10.3. During the construction and decommissioning phases, it is expected that there will be requirements to place machinery temporarily within Flood Zone 2 and Flood Zone 3 whilst groundworks are undertaken. It is not expected that this will result in any change of flood risk from baseline conditions.

15.10.4. The construction and decommissioning phases would result in an increase to the potential for soil erosion where there will be vehicle movements, earthworks and vegetation stripping. These onsite activities will have the potential to increase silt laden runoff and mobilisation of pesticides, herbicides and fertilisers already present within the soil, resulting in the sedimentation and pollution of watercourses, which could degrade water quality of the receiving Water Framework Directive classified waterbody. As the soil is already frequently disturbed for crop harvest and ploughing, then the construction and decommissioning phases would not deviate significantly from the baseline situation.

Operational (including maintenance) phase

15.10.5. With regards to fluvial flood risk, as the Satellite Collector Compounds, Main Collector Compound, Rosefield Substation Compound and BESS are all to be located within Flood Zone 1 and outside of Flood Zone 2 and Flood Zone 3, these components will have negligible impacts on flood risk during the operational (including maintenance) phase.

15.10.6. The Solar PV modules are to be located within Flood Zone 2 and Flood Zone 3 within parts of Parcel 3 as shown in **Figure 2.1** in **Volume 2**. However, unlike the Compounds, Solar PV modules do not require ground raising and therefore there will be a negligible loss of flood plain as result of siting modules within Flood Zone 3.

15.10.7. Flood risk as a result of increased surface water runoff from increased hardstanding areas (e.g. Satellite Collector Compounds, Main Collector Compound, Rosefield Substation and BESS) will be mitigated against using formalised surface water drainage.

15.10.8. With the rainwater gap provided for between rows of Solar PV modules, there is no anticipated increase in volumes or rates of surface water runoff from areas of Solar PV modules within Rosefield Solar Farm.

15.10.9. During the operational (including maintenance) phase, overland surface water runoff from Solar PV modules could potentially create pathways between Rosefield Solar Farm and the Water Framework Directive classified waterbodies. It is expected that once vegetation is established on the land underlying the Solar PV modules, then soils will be stabilised and there will be negligible impacts on water quality discharging overland from these areas. Until vegetation is established it is expected that temporary silt fencing will remain in place.

15.10.10. The cessation of agricultural practices on the land could improve the quality of water runoff due to the reduction in the application of pesticides, herbicides and fertilizers, as well as the reduction in bare land cover between crop harvests.

15.10.11. During the operational (including maintenance) phase, formalised surface water drainage for areas of hardstanding will consider best practice for the mitigation of potential water quality pollution prior to discharge via a formalised outfall to a watercourse. Fire water runoff will be considered as part of the surface water drainage elements of the BESS, and how pollutants associated with fire water can be prevented from leaving the Site, via a penstock valve or similar.

15.11. Additional mitigation

Construction and decommissioning phases

15.11.1. An Outline Construction Environmental Management Plan will be submitted in support of the DCO application. The Outline Construction Environmental Management Plan is expected to include measures to mitigate the risk of increased runoff during the construction phase of Rosefield Solar Farm such as:

- The use of permeable materials for construction or lay-down areas;
- Constructing and using access tracks early in the programme;
- Appropriate storage of hydrocarbons and other pollutants; and
- Use of low-pressure tyres to limit compaction.

15.11.2. An Outline Decommissioning Environmental Management Plan will be submitted in support of the DCO application. The Outline Decommissioning Environmental Management Plan will include measures to mitigate the risk of increased runoff during the decommissioning phase of Rosefield Solar Farm such as:

- The use of permeable materials for compounds or lay-down areas; and
- Access tracks would remain until late in the programme and other mitigation (low-pressure tyres, tillage and storage of chemicals) would also be used.

Operational (including maintenance) phase

15.11.3. An Outline Operational Environmental Management Plan will be submitted in support of the DCO application. The Outline Operational Environmental Management Plan will set out measures in relation to the water environment.

15.12. Assessment of residual effects (with additional mitigation)

Construction, operational (including maintenance) and decommissioning phases

15.12.1. The Construction Compounds, Satellite Collector Compounds, Main Collector Compound, Rosefield Substation, BESS and Cable Route will be located within Flood Zone 1 for both Scenario 1 and Scenario 2 and reasonable worst case scenarios, which is land classified as a **low** sensitivity receptor to fluvial flood risk. As there will be no impacts on the flood plain as a result of Rosefield Solar Farm during construction, operation (including maintenance) and decommissioning, the magnitude of impact is considered to be **negligible**, resulting in a **negligible adverse** significance of effect, which is considered to be **not significant**.

15.12.2. The Solar PV modules will predominantly be located within Flood Zone 1, though a small percentage of panels may be within Flood Zone 2 and Flood Zone 3 in Parcel 3. This land is classified as a **high** sensitivity receptor to fluvial flood risk. However, as there are no impacts on the flood plain as a result of Rosefield Solar Farm during construction, operation (including maintenance) and decommissioning, the magnitude of impact is considered to be **negligible**, resulting in a **negligible adverse** significance of effect, which is considered to be **not significant**.

15.12.3. Much of Rosefield Solar Farm will drain towards Water Framework Directive classified waterbodies which are shown to be **medium** sensitivity receptors. With the embedded and additional mitigation in place during construction, operational (including maintenance) and decommissioning phases, the magnitude of impact is shown to be **negligible adverse**, resulting in a **negligible** significance of effect, which is considered to be **not significant**.

15.13. Opportunities for enhancement

15.13.1. The provision of a surface water drainage strategy (secured in the Outline Surface Water Drainage Strategy which will be submitted in support of the DCO application) for areas of proposed hardstanding will capture surface water runoff from these areas and will be discharged back into the environment and limited to greenfield runoff rates (typically the 1 in 1 year rate or QBAR rate (equivalent to the 1 in 2.3 year)). This means for rainfall events greater than the QBAR event, there is a reduction in the peak rates of surface water runoff leaving the development compared to the baseline

scenario. The resulting effect is flood risk may be reduced within the catchment theoretically.

15.13.2. The provision of vegetation cover (for the duration of the operational (including maintenance phase) below the Solar PV modules within Rosefield Solar Farm will help slow the rate of surface water runoff from the Site during high intensity rainfall events and promote the interception of surface water runoff. Compared to the baseline scenario, agricultural practices will periodically result in bare vegetation ground cover and exposed soils which can potentially increase the rate of surface water runoff. Linear depressions caused by the repeated movement of agricultural vehicles over the soil can also increase the velocity in which surface water leaves the Site and potentially increase peak runoff rates.

15.13.3. The cessation of arable agricultural activities and reduction in livestock grazing will result in a reduction of the application of pesticides, herbicides and fertilisers and effluent within the Site which would help improve the quality of surface runoff. Vegetation cover will also stabilise soils and reduce the mobilisation of these materials.

15.14. Difficulties and uncertainties

15.14.1. The following difficulties and uncertainties have been encountered in undertaking this preliminary assessment:

- The information provided in this PEIR is preliminary and is based on the information available at the time of writing. A full assessment of likely significant effects will be reported in the ES;
- The preliminary assessment of flood risk has been based on model data derived from a nationalised modelling data set. Therefore, flood depths and water levels are indicative. To provide any increase in certainty in flood depths, levels and extents a bespoke hydraulic flood modelling exercise would be required. The need (or otherwise) for such modelling will be discussed with the Environment Agency and Buckinghamshire Council (being the Lead Local Flood Authority);
- The impacts of climate change on the extents of Flood Zone 3 have been assumed to result in flooding with extents no worse than indicated by Flood Zone 2 extents. A hydraulic modelling exercise would be required to determine flood depths, water levels and extents with the inclusion of a climate change factor. The need (or otherwise) for such modelling will be discussed with the Environment Agency and Buckinghamshire Council (being the Lead Local Flood Authority);
- The surface water drainage strategy has not been designed at the time of writing this preliminary assessment. Therefore, the principles of the drainage strategy outlined in this preliminary assessment are based on assumption that best practice will be followed;
- No environmental surveys have been undertaken for the preliminary assessment of the Water Framework Directive classified waterbodies.

Baseline conditions are based on the Cycle 3 classifications and are assumed to be correct; and

- It has been assumed that the flood plain volume lost from the supports of Solar PV modules is negligible and no further mitigation is required. Further consultation is required with the Environment Agency to confirm this can be considered the case.

15.15. Further work required to inform the ES

15.15.1. To form a robust ES, the following work is proposed so that all aspects will be suitably considered.

15.15.2. A Flood Risk Assessment will be undertaken which will inform the ongoing design of Rosefield Solar Farm. The Flood Risk Assessment will be submitted in support of the DCO application and in parallel with the preparation of the ES.

15.15.3. The Flood Risk Assessment will be undertaken in accordance with the policy requirements set out at 5.8.13-23 of NPS EN-1 (2023). The Flood Risk Assessment will be made using the data available for the fluvial and the surface water flood risk and establishing which areas of Rosefield Solar Farm are at risk from these flood risk sources. The assessment will consider the vulnerability of those using the Site, including arrangements for safe access and escape.

15.15.4. A quantitative assessment will be made in relation to whether Rosefield Solar Farm will cause an increase in flood risk elsewhere, either as a result of modifications to the flood plain or changes in ground permeability which can alter the surface water runoff from the Site. The assessment will be made by calculating greenfield runoff rates from the Site and ensuring that surface water runoff rates from proposed areas of impermeability (as a result of construction and operation (including maintenance)) do not exceed existing greenfield runoff rates. The quantitative assessment into runoff rates will also consider the requirements for sustainable drainage systems (SuDS) to mitigate against any potential increases in runoff rates from impermeable constructed areas.

15.15.5. Through the implementation of the Outline Surface Water Drainage Strategy, the Flood Risk Assessment will if practicable identify and secure opportunities to reduce the causes and impacts of flooding overall, making as much use as possible of natural flood management techniques as part of an integrated approach to flood risk management.

15.15.6. The Environment Agency will be formally consulted on the latest updated Zonal Masterplan and their opinion on the requirement for bespoke hydraulic flood modelling will be sought.

15.15.7. The Environment Agency will be formally consulted to seek their opinion on whether the volume of flood water displaced by panel supports can be

considered as negligible or whether flood plain compensation (by way of minor land reprofiling) should be considered.

15.15.8. The Environment Agency will be formally consulted on the requirement for Water Framework Directive screening, scoping and impact assessment in line with the recommendations of the Planning Inspectorate's Advice Note Eighteen: the Water Framework Directive.

16. Glint and Glare

16.1. Introduction

16.1.1. This chapter presents the preliminary assessment of the likely significant effects of glint and glare during the operation (including maintenance) of Rosefield Solar Farm and should be read in conjunction with the following figures and appendix in **Volume 2** and **Volume 3**, respectively:

- **Figure 16.1: Solar PV areas and receptors – 10 km**;
- **Figure 16.2: Solar PV areas and receptors – 1 km;** and
- **Appendix 16.1: Glint and Glare assessment results.**

16.1.2. Whilst solar panels are specifically designed to absorb and not to reflect solar irradiation, the sun's rays may be reflected at certain angles, causing glint and glare. Glint is defined as a momentary flash of light that may be produced as a direct reflection of the sun in the solar panel. Glare is a continuous source of excessive brightness experienced by a stationary observer located in the path of reflected sunlight from the face of the panel[1].

16.1.3. Glint and glare could be triggered as panels are installed during construction, but the likely worst case of any glint and glare impacts would be once the whole solar farm is constructed (i.e. operational). For this reason, this preliminary assessment focuses on the operational (including maintenance) phase.

16.2. Stakeholder engagement

16.2.1. No specific consultation has been undertaken to inform this preliminary assessment. The Applicant will seek to agree the proposed Study area and receptors that will inform the glint and glare assessment that will be undertaken and appended to the ES in support of the DCO application with Buckinghamshire Council.

16.3. Legislative framework, planning policy and guidance

16.3.1. This preliminary assessment has been undertaken with regard to the following legislation, planning policy and guidance.

Legislation

16.3.2. There is no legislation of relevance to the glint and glare assessment.

[1] National Policy Statement for Renewable Energy Infrastructure NPS EN-3 (2023), Section 2.10.102.

National planning policy

- Overarching National Policy Statement for Energy (NPS EN-1) (2023)[2] – provides the basis for decisions regarding nationally significant energy infrastructure. Section 5.5.55 is related to the planning policy for glint and glare regarding civil and military aviation.
- National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (2023)[3] – Sections 2.10.102-106 set out general considerations for the assessment of impacts of glint and glare in relation to solar panels. Sections 2.10.134-136 give advice on possible mitigation measures to address the impacts of glint and glare. Sections 2.10.158-159 state "*Solar PV panels are designed to absorb, not reflect, irradiation. However, the Secretary of State should assess the potential impact of glint and glare on nearby homes, motorists, public rights of way, and aviation infrastructure (including aircraft departure and arrival flight paths). Whilst there is some evidence that glint and glare from solar farms can be experienced by pilots and air traffic controllers in certain conditions, there is no evidence that glint and glare from solar farms results in significant impairment on aircraft safety. Therefore, unless a significant impairment can be demonstrated, the Secretary of State is unlikely to give any more than limited weight to claims of aviation interference because of glint and glare from solar farms.*".
- Planning Practice Guidance for Renewable and Low Carbon Energy[4]. Paragraph 013 sets out guidance for large scale ground-mounted solar photovoltaic farms. It details particular factors a local planning authority will need to consider, including the effect on landscape of glint and glare on neighbouring uses and aircraft safety.

Local planning policy

16.3.3. Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021)[5], specifically Policy C3 Renewable Energy, which states that planning permission will normally be granted for off-site renewable energy

[2] Department for Energy Security and Net Zero. (2023). Overarching National Policy Statement for Energy (EN-1). Available online: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1

[3] Department for Energy Security and Net Zero (2023). National Policy Statement for Renewable Energy Infrastructure (EN-3). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3

[4] Planning Practice Guidance for Renewable and Low Carbon Energy (2023). Available online: https://www.gov.uk/guidance/renewable-and-low-carbon-energy

[5] Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021). Available online: [redacted]

(including solar) where it has been demonstrated that certain criteria have been met including that there is no significant adverse impact on local amenity, health, quality of life as a result of outlook through unacceptable visual intrusion and that there is no adverse impact on highway safety.

Guidance

16.3.4. There is no provision on glint and glare from the European Aviation Safety Authority. The UK CAA (Civil Aviation Authority) guide (Renewable energy developments: solar photovoltaic developments CAST Aerodrome Safeguarding 2023)[6] only provides high-level guidance regarding safety considerations (Air Traffic Service personnel and pilots) and the Study area, but it does not prescribe a specific methodology for assessing glint and glare effects.

16.3.5. Many aviation stakeholders refer to the US Federal Aviation Administration (FAA) guide (Interim Policy, FAA Review of Solar Energy System Projects on Federally Obligated Airports 2013)[7]. This document recommends undertaking the technical assessments using the Solar Glare Hazard Analysis Tool, developed by Sandia National Laboratories.

16.3.6. In addition to the FAA guide, this preliminary assessment has also been carried out in accordance with industry best practice and the 4th edition of the Solar Photovoltaic and Building Development Glint and Glare Guidance, published by Pager Power in 2022[8].

16.4. Study area

16.4.1. There is little formal guidance with regard to the maximum distance at which glint and glare should be assessed. However, based on industry best practice and past assessment experience, the Study area applied to this preliminary assessment comprises:

- 1 km from the Site boundary for ground-based receptors including residential dwellings, roads and railway signals and drivers. This is due

[6] Renewable energy developments: solar photovoltaic developments CAST Aerodrome Safeguarding Guidance Note (2023). Available online: [redacted]

[7] Interim Policy, FAA Review of Solar Energy System Projects on Federally Obligated Airports (2013). Available online: [redacted]t

[8] Pager Power. Solar Photovoltaic and Building Development – Glint and Glare Guidance. Fourth Edition (2022). Available online: [redacted]

to the reduced visibility (shielding by obstructions), and lower impact that occurs with distance (smaller size of reflections); and

- 10 km from the Site boundary for aviation receptors. The approach for determining the receptor locations on the approach path is undertaken by selecting locations along the runway centre line from 50 ft (approx. 15.24 m) above the runway threshold out to a distance of 2 miles (approx. 3.2 km) as outlined in the US Federal Aviation Administration (FAA) guide (Interim Policy, FAA Review of Solar Energy System Projects on Federally Obligated Airports 2013)[9]. The approach phase (arrival flight paths) is considered in the estimation of impact as this is deemed to be the most sensitive phase of a flight. Departing aircraft will have the nose pointing upwards and the visibility of objects (i.e. reflective panels) located on the ground will be reduced and therefore this has not been considered.

16.5. Establishing baseline conditions

16.5.1. Existing glint and glare conditions have been determined through a desktop study. A site visit will be undertaken to the agreed Study area for the full glint and glare assessment, the findings of which will be submitted in support of the DCO application.

16.6. Environmental baseline

16.6.1. There are no operational solar developments within the Study area.

16.6.2. None of the typical glare sources in rural environments are causing adverse instances of glint or glare around the Site at present. These sources include:

- Rainwater collected on rooves, fields, and roads;
- Bodies of water e.g. ponds/lakes/rivers; and
- Building/greenhouse windows.

Future baseline conditions

16.6.3. It is considered feasible that new (natural) glint and glare sources (such as new bodies of water) could be introduced to the Study area in the future.

16.7. Mitigation embedded into the design

16.7.1. This preliminary assessment has been based on the principle that measures have been ‘embedded’ into the design of Rosefield Solar Farm

[9] Interim Policy, FAA Review of Solar Energy System Projects on Federally Obligated Airports (2013). Available online: [redacted]

to remove potential likely significant effects as far as practicable, for example by the considered placement of infrastructure and landscape screening buffers. Embedded (primary) environmental mitigation measures that are considered to be an inherent part of Rosefield Solar Farm are detailed within **Chapter 5: Approach to the EIA**. The embedded mitigation measures relevant to glint and glare and the benefits these provide are outlined in **Table 12.6** below.

Table 16.1 – Embedded mitigation measures relevant to glint and glare

Embedded mitigation measures relevant to glint and glare	Benefit
Removal of Knowlhill (Field B17) and half of Field B9 from Solar PV development. Removal of fields south-west of Botolph Claydon (Fields D1, D2, D3 North, and D5) from Solar PV development. No Solar PV development will occur within the centre/north of the Site (between Parcels 1, 1a and 2).	This reduces the areas identified as having the potential to cause adverse effects and as such will reduce the overall impact of Rosefield Solar Farm in relation to glint and glare.
Any vegetation cleared to facilitate the construction of Rosefield Solar Farm will be compensated during operation by a planting scheme that equals or exceeds the current levels of vegetation. Landscape screening as shown in **Figure 3.4: Landscape and Ecological Mitigation and Enhancements Plan** in **Volume 2**.	The landscape screening buffers block the reflected light from sensitive receptors, thus reducing adverse glint and glare effects.

16.7.2. Solar PV modules are specifically designed to absorb light rather than reflect it. Light reflecting from Solar PV modules results in reduced energy output. Solar PV modules are dark in colour due to their anti-reflective coatings and are manufactured with low-iron, ultra-clear glass with specialised coatings and textures to enable maximum absorption. The combination of these factors increases electrical energy production of the panels and reduces reflected rays at the same time.

16.8. Optionality

16.8.1. **Chapter 5: Approach to the EIA** sets out those elements of Rosefield Solar Farm for which optionality is present within the current design and sets out the scenarios assessed for the purpose of this PEIR.

16.8.2. The preliminary design principles as outlined in **Chapter 5: Approach to the EIA** and preliminary parameter plans (**Figure 3.1** to **3.5** in **Volume 2**)

set out the reasonable 'worst case scenario' of the extent of Solar PV modules that has been assessed within this chapter. The 'worst case scenario' in relation to this preliminary glint and glare assessment are described in **Table 16.2** below

Table 16.2 – Optionality scenerios assessed

Project element	Scenario assessed for this preliminary assessment
Solar PV modules	The worst-case extent of Solar PV modules as detailed on **Figure 3.1 to 3.5** in **Volume 2** has been assessed within this chapter.
Satellite Collector Compounds Construction Compounds BESS Rosefield Substation and Main Collector Compound	These other elements would not cause material levels of glint and glare, therefore, optionality testing is not required for the preliminary glint and glare assessment as this considers the worst case scenario with embedded mitigation (as detailed in **Table 16.1**).

16.9. Approach to the preliminary assessment

16.9.1. The methodology for this preliminary assessment has been developed based on industry best practice, available guidance and professional experience. It comprises the following stages, utilising glint and glare guidance, published by Pager Power in 2022[10]:

- Identification of key sensitive receptors;
- Use of modelling and geometric annual calculations to determine solar reflections that are visible from each receptor;
- Where visible reflections are predicted, determination of the glint and glare impact using the Solar Glare Hazard Analysis Tool, in line with Sandia National Laboratories' Federal Aviation Administration methodology[11];
- Determination of the significance of the potential effects upon each receptor, following the specific criteria for each type of receptor; and

[10] Pager Power. Solar Photovoltaic and Building Development – Glint and Glare Guidance. Fourth Edition (2022). Available online: [redacted]

[11] Interim Policy, FAA Review of Solar Energy System Projects on Federally Obligated Airports 2013. Available online: [redacted]

- Where significant effects are anticipated, consideration is afforded to proposing mitigation (screening) between the receptor and the reflecting solar panels.

Key receptors

16.9.2. Within the Study area, there are a number of sensitive receptors which include road users, railway operations and infrastructure, residential properties, and aerodromes (see **Figures 16.1** and **16.2** in **Volume 2**).

16.9.3. Roads users within 1 km of the Site boundary comprise (receptor references in brackets, as outlined in **Figures 16.1** and **16.2** in **Volume 2**):

- Werner Terrace/Brackley Lane (OP12);
- Calvert Road/Addison Road (OP13);
- Calvert Road (OP14);
- Orchard Way/Botyl Road (OP27); and
- Quainton Road/Granborough Road (OP28).

16.9.4. Railway signals and driver receptors within 1 km of the Site boundary comprise (receptor references in brackets, as outlined in **Figures 16.1** and **16.2** in **Volume 2**):

- Receptor points along the Aylesbury Vale - Milton Keynes line (OP37), based on a train driver's eye level typically 2.75 m above rail.

16.9.5. Occupants or residential dwellings within 1 km of the Site boundary comprise 33 receptors (receptor references OP1-OP11, OP15-OP26, OP27-OP36, as outlined in **Figures 16.1** and **16.2** in **Volume 2**).

16.9.6. Aerodromes (with no control towers) and their east and west approaching flying paths within 10 km from the Site boundary comprise:

- Finmere Aerodrome (OP39): 7 km to the north-west, with flying paths FR39 east and west; and
- Thornborough Ground Airstrip (OP40): 10 km to the north-east, with flying paths FR40 east and west.

Assessment tools

16.9.7. The Solar Glare Hazard Analysis Tool is based on the Retinal Glare Hazard Ocular Plot (**Plate 16.1**). This is the standard metric for measuring the ocular impact of any proposed solar energy system. Retinal Glare Hazard Ocular Plot is a function of the retinal irradiance (brightness) and the subtended angle (size) of the glare source. The results are classified as:

- Green glare: Low potential to cause after-image;

- Yellow glare: Potential to cause an after-image; and
- Red glare: Potential for permanent eye damage.

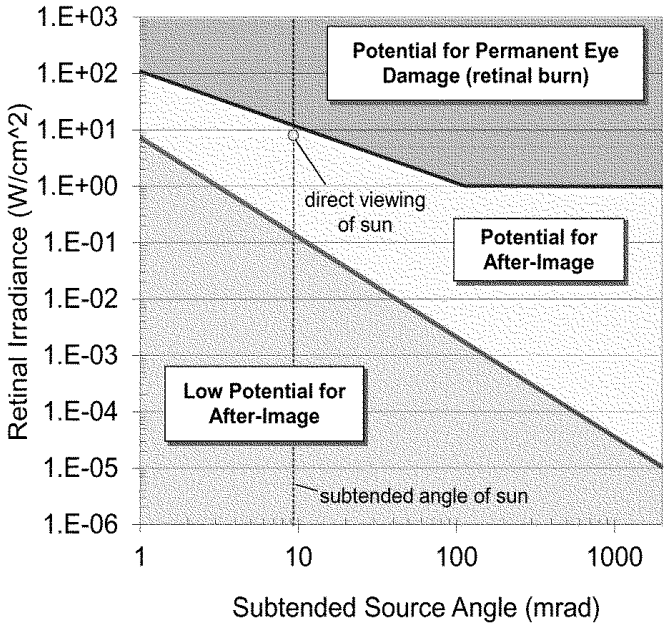


Plate 16.1 Retinal Glare Hazard Ocular Plot

16.9.8. The simulated test environment has been taken from Forge Solar, which uses information from Google Maps, which defines the location, extents and elevation for the receptors, terrain levels and obstructions.

16.9.9. Forge Solar follows the Solar Glare Hazard Analysis Tool method with the following assumptions:

- Clear and sunny sky for the entire year, as a worst-case scenario;
- Fixed intensity within the cone of reflection, including the slope error;
- No obstructions considered between the reflection and the receptor;
- No consideration for Solar PV overshadowing between rows of panels, gaps between them or supporting structures;
- The combined effects of several Solar PV modules are considered cumulatively, without consideration for simultaneity; and
- The topographic profile of each Solar PV array is simplified to a single plane.

Significance criteria

16.9.10. Impact significance is based on published glint and glare guidance (Pager Power, 2022)[12]. This includes general glint and glare significance and specific criteria tailored by receptor type (flying paths, railways, roads, etc.).

16.9.11. In general, the significance criteria for glint and glare effects are as follows:

- No impact: A solar reflection is not geometrically possible or will not be visible from the assessed receptor. No mitigation required;
- Low: A solar reflection is geometrically possible; however, any impact is considered to be small such that mitigation is not recommended e.g. intervening screening will limit the view of the reflecting solar panels significantly or the glare time per year is considered negligible. No mitigation recommended;
- Moderate: A solar reflection is geometrically possible and visible; however, it occurs under conditions that do not represent a worst case scenario e.g. a solar reflection originates from a less sensitive location. Mitigation recommended;
- High impact: A solar reflection is geometrically possible and visible under conditions that will produce a significant impact. Mitigation will be required if the proposed development is to proceed.

16.9.12. Specific significance criteria for different receptors are presented in **Table 16.2**.

Table 16.2 – Specific significance criteria for different receptors

Glare condition	Significance and mitigation
Approaching aircraft	
Green glare or yellow glare with screened reflections	No mitigation (Low impact). Federal Aviation Administration guidance[13] allows for green glare along the final approach.
Yellow glare without screening	Mitigation required (Moderate impact).
Red glare	Mitigation required (High impact).

[12] Pager Power. Solar Photovoltaic and Building Development – Glint and Glare Guidance. Fourth Edition (2022). Available online: [redacted]

[13] Interim Policy, FAA Review of Solar Energy System Projects on Federally Obligated Airports (2013). Available online: [redacted]

Glare condition	Significance and mitigation
ACT Towers	
Green glare with screened reflections	Mitigation not required (Low impact).
Green or yellow glare without screening	Mitigation recommended (Moderate impact).
Red glare	Mitigation required (High impact).
Railways	
Solar reflections within the driver's field of view.	Mitigation not required (Low impact).
Solar reflections directly in front of the train driver with mitigating factors	Mitigation not required (Low impact) or recommended (Moderate impact), depending on the remaining factors.
Solar reflections directly in front of the train driver without mitigating factors	Mitigation required (High impact).
Railway Signals	
Solar reflections do not intercept a railway signal (within 180 degrees from the signal)	Mitigation not required (Low impact).
Solar reflections intercept a signal with mitigating factors.	Mitigation not required (Low impact).
Solar reflections intercept a signal without mitigating factors	Mitigation recommended (Moderate impact).
Solar reflections illuminate an incandescent signal directly	Mitigation required (High impact).
Roads	
Local roads or reflections outside the driver's field of view	Mitigation not required (Low impact).
Major national or regional roads with reflections within the field of view	Mitigation not required (Low impact) or mitigation recommended (Moderate impact), depending on remaining factors.
Major national or regional roads with reflections directly in front of the driver	Mitigation required (High impact).
Note: The location of origin of reflection is more significant than its duration for roads, as the receptor is moving.	
Dwellings	
Reflections last for less than 3 months/year AND less than 60 min/day	Mitigation not required (Low impact).
Reflections last for less than 3 months/year OR less than 60 min/day	Mitigation not required (Low impact) or mitigation recommended (Moderate impact), depending on remaining factors.

Glare condition	Significance and mitigation
Reflections exceed 3 months/year AND 60 min/day with mitigating factors	Mitigation not required (Low impact) or mitigation recommended (Moderate impact), depending on remaining factors.
Reflections exceed 3 months/year AND 60 min/day without mitigating factors	Mitigation required (High impact).

Assessment assumptions

16.9.13. This preliminary assessment has been undertaken in accordance with the current design of Solar PV modules as set out in **Chapter 3: Description of Rosefield Solar Farm**. This preliminary assessment considers fixed panels with:

- Orientation: due south;
- Tilt: 30 degrees;
- Material: smooth glass without anti-reflective coating; and
- Slope error: 6.55 milliradians.

16.9.14. A maximum 50 degree viewing angle has been considered for the Aylesbury Vale – Milton Keynes railway line (Receptor reference OP37, as outlined in **Figures 16.1** and **16.2** in **Volume 2**). For aviation receptors (Finmere Aerodrome (OP39) and Thornborough Ground Airstrip (OP40)), an additional maximum downwards viewing angle of 30 degree has been assumed for this preliminary assessment.

16.9.15. The following values have been assumed in the calculation:

- Peak Direct Normal Irradiance (DNI) 1kW/m^2;
- Ocular transmission coefficient 0.5;
- Pupil diameter 0.002 m; and
- Eye focal length 0.017 m.

16.10. Assessment of likely effects (without additional mitigation)

16.10.1. Multiple rounds of glint and glare testing of all arrays have been carried out during the design process undertaken so far, with the proposed Solar PV modules in place (**Appendix 16.1** in **Volume 3**), to optimise the proposal and to minimise any potential impacts to surrounding sensitive receptors. This included reduced Solar PV areas around receptor OP4 in Parcel 1, around receptor OP22/OP23 in Parcel 2, and around receptor OP30 in Parcel 3. Tree barriers were also incorporated around receptors OP11, OP7 and OP22/OP23. A tracking system was discarded.

16.10.2. The preliminary technical analysis has shown no visible reflections along the Aylesbury Vale - Milton Keynes railway line (receptor reference OP37, as outlined in **Figures 16.1** and **16.2** in **Volume 2**) or from Finmere Aerodrome (OP39) or Thornborough Ground Airstrip (OP40), or their approaching flying paths (FP39 and FP40). Therefore, there are no likely significant effects to either railways, aerodromes or flying paths.

16.10.3. With regards to roads, the preliminary results showed only a few hours of glare on road receptors. All these receptors correspond to local roads, and therefore these reflections are expected to have a **Low** impact with no likely significant effects, and therefore they do not require additional mitigation.

16.10.4. With regards to dwellings, the duration of glare is the key parameter. The preliminary assessment concludes that at present, no dwelling receives more than 60 minutes of glare per day and three months per year. The embedded mitigation is especially effective for receptors OP7, OP11, OP22 and OP23, as outlined in **Figures 2.1 to 2.4** in **Appendix 16.1** in **Volume 3**. Dwelling receptors are predicted to have no impact or **Low** impacts, with no likely significant effects, and therefore they do not require additional mitigation.

16.11. Additional mitigation

16.11.1. No additional mitigation measures are required as there are no significant effects anticipated, taking into account the embedded mitigation measures which form an inherent part of Rosefield Solar Farm (refer to **Section 16.7**).

16.12. Assessment of residual effects (with additional mitigation)

16.12.1. Since no additional mitigation is required, there are no residual glint and glare effects, as outlined in **Section 16.10** above.

16.13. Opportunities for enhancement

16.13.1. No enhancement opportunities relating to glint and glare have been identified at this stage, and none are anticipated.

16.14. Difficulties and uncertainties

16.14.1. The information provided in this PEIR is preliminary and is based on the information available at the time of writing. The final assessment of impacts will be reported in the ES.

16.14.2. The preliminary assessment has been undertaken using high level modelling to determine the potential effects of the maximum extent of Solar PV development for Rosefield Solar Farm. The full glint and glare assessment will be informed by the design of Rosefield Solar Farm

submitted in support of the DCO application and the parameters that will inform the ES.

16.15. Further work required to inform the ES

16.15.1. A full glint and glare assessment will be undertaken for Rosefield Solar Farm which will be submitted in support of the DCO application and will form a technical appendix to the ES, as required by the Planning Inspectorate's Scoping Opinion dated 21 December 2023.

17. Other Environmental Considerations

17.1. Introduction

17.1.1. This chapter presents consideration of the following environmental matters that have not been subject to a preliminary assessment and will not be subject to detailed assessment in the ES, but are considered worthy of mention:

- Heat and radiation (**Section 17.2**);
- Electric, magnetic, and electromagnetic fields (**Section 17.3**);
- Major accidents and disasters (**Section 17.4**);
- Utilities (**Section 17.5**);
- Human health (**Section 17.6**);
- Material assets and waste (**Section 17.7**); and
- Transboundary effects (**Section 17.8**).

17.1.2. **Chapter 5: Approach to EIA** sets out those elements of Rosefield Solar Farm for which optionality is present within the current design and sets out the scenario assessed for the purpose of this PEIR.

17.1.3. The preliminary design principles, as outlined in **Chapter 5**, and preliminary parameter plans (**Figure 3.1 – 3.5** in **Volume 2**) set out the reasonable 'worst case scenario' that has been considered within this chapter. These 'worst case scenario' options are described in **Table 17.1** below unless stated otherwise.

Table 17.1 – Optionality scenarios considered

Project element	Optionality
Solar PV modules	The worst case extent of Solar PV modules has been assessed in this chapter.
Balance of Solar System	This preliminary assessment assumes the BoSS to be located independently outdoors and that central inverters would be used, as this is considered to be the worst case scenario.
Satellite Collector Compounds	Satellite Collector Compound would be located in either of the below fields in Parcel 1: • Field B10 • Field B23 (South) Satellite Collector Compound would be located in either of the below fields in Parcel 2:

Project element	Optionality
	• Field D8 • Field D9 • Field D17 The location of the Satellite Collector Compound does not affect any of other environmental considerations presented in this chapter, unless otherwise indicated.
Main Collector Compound	There are four fields that are considered suitable for the Main Collector Compound, which are located in Parcel 3, as outlined in **Figure 1.2** and detailed below. • Field E23 • Field E22 • Field E21 • Field E20 The location of the Main Collector Compound does not affect any of other environmental considerations presented in this chapter, unless otherwise indicated.
BESS	For the purposes of this preliminary assessment, there are two scenarios for the BESS locations in conjunction with the Rosefield Substation. 1. Rosefield Substation in Field E11 and BESS units located in Fields D8, D9 and E23 (outlined in **Figure 5.1**). 2. Rosefield Substation in Field E23 and BESS units located in Fields D8, D9 and E23 (outlined in **Figure 5.2**). The location of the BESS does not affect any of other environmental considerations presented in this chapter, unless otherwise indicated.
Rosefield Substation	For the purposes of this preliminary assessment, the following Rosefield Substation locations in conjunction with the BESS, have been assessed as part of this PEIR: 1. Rosefield Substation in Field E11 and BESS units located in Fields D8, D9 and E23 (outlined in **Figure 5.1**). 2. Rosefield Substation in Field E23 and BESS units located in Fields D8, D9 and E23 (outlined in **Figure 5.2**).

Project element	Optionality
	The location of Rosefield Substation does not affect any of other environmental considerations presented in this chapter, unless otherwise indicated.
Main Construction Compound	Main Construction Compound would be located in either of the below fields in Parcel 1: • Field B23 (South) • Field B20 Main Construction Compound would be located in either of the below fields in Parcel 2: • Field D7 • Field D8 • Field D9 Main Construction Compound would be located in either of the below fields in Parcel 3: • Field E21 • Field E22 • Field E23 • Field SA50 The location of the Main Construction Compound does not affect any of other environmental considerations presented in this chapter, unless otherwise indicated.
Satellite Construction Compounds	Satellite Construction Compound would be located in either of the below fields in Parcel 1: • Field B3 • Field B6 • Field B7 • Field B10 Satellite Construction Compound would be located in the below field in Parcel 2: • Field D27 Satellite Construction Compound would be located in either of the below fields in Parcel 3: • Field E10 • Field E11

Project element	Optionality
	• Field E20 The location of the Satellite Construction Compounds does not affect any of other environmental considerations presented in this chapter, unless otherwise indicated.
Cable route to connect the Solar PV modules, BoSS, Collector Compounds, Rosefield Substation and BESS	For the purposes of this preliminary assessment, Option B has been assessed as this is considered to be the worst case scenario, unless outlined in the environmental factor assessment chapters (**Chapters 6** to **16**).

17.2. Heat and radiation

17.2.1. Due to the scale and nature of Rosefield Solar Farm, it is not anticipated that there would be any significant sources of heat or radiation during construction, operation (including maintenance) or decommissioning. The ES will outline any identified sources of heat and radiation within the Rosefield Solar Farm design.

17.3. Electric, magnetic and electromagnetic fields (EMF)

17.3.1. Rosefield Solar Farm includes electrical infrastructure that, when operational, would produce electric and magnetic fields (EMFs), namely underground cabling. EMFs arise from the generation, transmission, distribution and use of electricity. Electric fields are produced by voltage, which is the pressure behind the flow of electricity and which depends on the operating voltage of the equipment. Magnetic fields are produced by current, which is a measure of the flow of electricity and depends on the electrical current.

17.3.2. EMFs can have both direct and indirect effects on human health and ecological receptors. Direct impacts include effects on the central nervous system. As referenced in NPS EN-5 (paragraph 2.9.48)[1], to prevent these known effects the International Commission on Non-Ionizing Radiation Protection (ICNIRP) published health protection guidelines in 1998[2].

[1] Department for Energy Security and Net Zero (2023) National Policy Statement for Electricity Networks Infrastructure (EN-5). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5

[2] International Commission on Non-Ionizing Radiation Protection (1998) International Commission on Non-Ionizing Radiation Protection Guidelines: For limiting exposure

17.3.3. The ICNIRP states that cables at voltages up to and including 132 kV are not capable of exceeding the ICNIRP exposure guidelines. The operation (including maintenance) of Rosefield Solar Farm would use cables of up to 132 kV and would therefore not exceed these exposure guidelines.

Electrical fields can be blocked by fences, shrubs and buildings and the intensity of the electric and magnetic fields decreases further from the source. As set out in **Table 5.2** in **Chapter 5**, the design of Rosefield Solar Farm includes embedded mitigation including a minimum 250 m offset from the fence line around the ITS, BESS, Rosefield Substation and Collector Compounds to residential properties determined on a case by case basis; and a minimum 10 m offset from the fence line around Rosefield Solar Farm from existing and proposed public rights of way (except where crossing are necessary) to avoid the potential for any EMF effects on sensitive receptors.

17.3.4. Therefore, the EMF effects during the construction, operation (including maintenance) and decommissioning of Rosefield Solar Farm are likely to be not significant.

17.4. Major accidents and disasters

17.4.1. Guidance on the consideration of major accidents and disasters is provided by IEMA[3]. This focuses on the consideration of low likelihood/high consequence events, which would result in serious harm or damage to environmental receptors, and which could encompass risks exacerbated by climate change. This includes accidents or disasters originating from a proposed development as well as external events (man-made or natural).

17.4.2. In considering likely significant effects from the vulnerability of Rosefield Solar Farm to risks of accidents and disasters, it is important to note that the UK already has a structured framework of risk management legislation in place. Vulnerability to major accidents and/or disasters for infrastructure and other built environment developments is covered by a wide range of other safety and non-safety-related legislation, as detailed below:

- Health and Safety at Work Act 1974[4];

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to time-varying electric, magnetic and electromagnetic field (up to 300GHz), Health Physics 74 (4): 494-522. Available online: https://www.icnirp.org/cms/upload/publications/ICNIRPemfgd l.pdf

[3] IEMA (2020a) Major Accidents and Disasters in EIA: An IEMA Primer. Available online: https://www.iema.net/resources/reading-room/2020/09/28/major-accidents-and-disasters-in-eia-an-iema-primer

[4] Health and Safety at Work Act 1974. Available online: https://www.legislation.gov.uk/ukpga/1974/37/contents

- Construction (Design and Management) Regulations 2015[5];
- The Construction (Health, Safety and Welfare) Regulations 1996[6]; and
- Electricity Safety, Quality and Continuity Regulations 2002[7].

17.4.3. The risk of major accidents and disasters is being considered throughout the design process of Rosefield Solar Farm. This includes siting the potentially hazardous equipment, such as the BESS and grid infrastructure, at a suitable distance from sensitive receptors.

17.4.4. The construction, operational (including maintenance) and decommissioning phases of Rosefield Solar Farm may give rise to major accidents and/or disasters. **Table 17.2** presents a list of possible major accidents and disasters.

Table 17.2 – Possible major accidents and disasters

Major accident and/or disaster	Potential receptor	Comments
Flooding	Properties Local residents	The majority of Rosefield Solar Farm is located within Flood Zone 1 and is at low risk of surface water flooding. Therefore, it is not considered to be at significant risk of river flooding or surface water flooding. The potential vulnerability of Rosefield Solar Farm to flooding and its potential to exacerbate flooding is assessed in **Chapter 15**.
Fire	Properties Local residents Local habitats and species	There is a potential fire risk associated with the BESS. This would be managed by a cooling system, which would form part of the BESS and which is designed to regulate temperatures to safe conditions to minimise the risk of fire. As stated in **Table 5.1** in **Chapter 5**, the BESS and associated grid infrastructure are proposed to be sited a suitable distance from sensitive receptors in accordance with BESS

[5] Construction (Design and Management) Regulations 2015. Available online: https://www.legislation.gov.uk/uksi/2015/51/contents/made
[6] The Construction (Health, Safety and Welfare) Regulations 1996. Available online: https://www.legislation.gov.uk/uksi/1996/1592/contents/made
[7] Electricity Safety, Quality and Continuity Regulations 2002. Available online: https://www.legislation.gov.uk/uksi/2002/2665/contents/made

Major accident and/or disaster	Potential receptor	Comments
		standards (UL9540) and National Fire Chiefs Council Guidance (2023)[8]. Consultation with the Fire and Rescue Service has been initiated as part of the DCO process and this will inform the ES. An Outline Battery Safety Commitments Plan will be submitted in support of the DCO application. The Outline Battery Safety Commitments Plan is will ensure the safe operation of the BESS and will set out the parameters for the management of fire risk associated with the BESS. A plume assessment will be submitted as part of the DCO application.
Aircraft disasters	Pilots	The potential for glint and glare to affect aircraft is assessed within **Chapter 16**.
Plant disease	Habitats and species	New planting may be susceptible to biosecurity issues, such as increased prevalence of pests and disease, due to source of provenance and climate change. An Outline Landscape and Ecological Management Plan will be submitted in support of the DCO application. The Outline Landscape and Ecological Management Plan is expected to take account of and set out measures to manage biosecurity risks.

17.4.5. Those major accidents and disasters that are not considered within the scope of the EIA will continue to be reviewed and addressed as part of the design process. The construction, operation (including maintenance) and decommissioning of Rosefield Solar Farm is considered to have no risk of major accidents or disasters that could affect existing or future receptors.

17.4.6. The embedded mitigation proposed as part of the Rosefield Solar Farm design described in **Chapter 3** and **Section 5.8** in **Chapter 5** would be sufficient to manage vulnerabilities to major accidents and/or disasters without the need for additional mitigation in most circumstances. By implementing recognised and approved safety standards and legislation,

[8] National Fire Chiefs Council. (2023). Grid Scale Batter Energy Storage System planning – Guidance for FRS. Available online: [redacted]

no likely significant effects in relation to major accidents and disasters are anticipated during the construction, operational (including maintenance) and decommissioning phases of Rosefield Solar Farm.

17.5. Utilities

17.5.1. Rosefield Solar Farm has the potential to affect existing utility infrastructure such as underground internet cables, water and sewer pipes and overhead electricity cables located at the Site. Given the nature of Rosefield Solar Farm, potential impacts to existing utility assets would be limited to the construction phase. To identify any existing infrastructure constraints, a utility search (including consultation with the utility provider) covering the Site (and 2 km from the Site boundary) has been undertaken.

17.5.2. The utilities search identified that there are no buried services crossing the Site. The underground internet cables and water and sewer pipes are located beneath the roads outside the Site boundary. Within the Site boundary, overhead electric cabling associated with the East Claydon National Grid Substation was identified including:

- National Grid extra high voltage transmission lines; and
- Electricity distribution high voltage transmission lines.

17.5.3. Further consultation has been carried out with the relevant utility companies to confirm the information drawn from the utility search is accurate and up to date.

17.5.4. In addition, consideration and advice has been sought regarding separation distances and methods of construction in close proximity to each utility to avoid any risk of impact during construction of Rosefield Solar Farm. The following parameters have been applied to the design after discussions with National Grid:

- 15 m offset from overhead lines; and
- 30 m offset from electrical towers.

17.5.5. The Outline Construction Environmental Management Plan will include any additional mitigation measures to protect against interference with below ground utilities during construction. The Applicant also expects to agree protective provisions with each utility owner, in order to ensure the DCO includes appropriate protections and restrictions on the Applicant's exercise of its powers, for the protection of utilities.

17.5.6. Taking the above into account, it is therefore anticipated that there will be no likely significant effects in relation to utilities as a result of Rosefield Solar Farm. The relevant utility owners will be provided with protective provisions as part of the DCO which will ensure that no detriment will occur to their assets during the undertaking of Rosefield Solar Farm.

17.6. Human health

17.6.1. The consideration of the likely effects for human health as a result of Rosefield Solar Farm are detailed in the findings of the following assessment sections of this PEIR:

- **Chapter 6: Air quality**;
- **Chapter 11: Landscape and visual;**
- **Chapter 12: Noise and vibration**;
- **Chapter 13: Population**;
- **Chapter 14: Transport and access;** and
- **Chapter 16: Glint and glare**.

17.6.2. Each of these chapters within this PEIR consider the likely effects for human health from Rosefield Solar Farm within their own preliminary assessments. The consideration of the likely cumulative effects for human health are detailed in **Chapter 18**.

17.7. Material assets and waste

17.7.1. Material assets are defined by IEMA (2020b) as "*substances used in each lifecycle stage of a development, with particular focus on the construction, operation (including maintenance), and decommissioning or 'end of first life' (deconstruction, demounting, demolition and disposal) phases*"[9]. Material assets can include 'material' (i.e. physical resources that are used across the lifecycle of a development) and 'excavated arisings' (i.e. soil, rock, or similar resource generated by excavations).

17.7.2. Waste is defined as "*any substance or object which the holder discards or intends or is required to discard*". The Waste Framework Directive[10] definition includes any substance or object that is discarded for disposal or that has not been subject to acceptable recovery (including reuse and recycling).

17.7.3. The main impacts (changes) and effects (consequences) of materials consumption and waste disposal are presented in **Table 17.3**.

[9] IEMA (2020b) IEMA guide to Materials and Waste in Environmental Impact Assessment. Available online: [redacted]

[10] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (Text with EEA relevance). Available online: [redacted]

Table 17.3 – Material assets (from IEMA guide to materials and waste in Environmental Impact Assessment).

Matter	Direct impacts	Potential effects	Applicable phase
Materials	Consumption of resources	Depletion of resources, resulting in the temporary or permanent degradation of the natural environment.	Construction, decommissioning
Waste	Generation and disposal of waste	Reduction in landfill capacity. Unsustainable use or loss of resources to landfill resulting in the temporary or permanent degradation of the natural environment.	Construction, decommissioning

17.7.4. The indirect impacts associated with materials consumption and waste disposal (e.g. release of greenhouse gas emissions, water consumption, amenity impacts, ecological impacts, etc.) are assessed within the following chapters of this PEIR:

- **Chapter 7: Biodiversity**;
- **Chapter 8: Climate**;
- **Chapter 11: Landscape and visual;** and
- **Chapter 15: Water**.

17.7.5. Similarly, the indirect impacts of any off-site waste management facilities and material production facilities are expected to be assessed (and where necessary, mitigated) under the planning and permitting regime for those sites and thus do not form part of an EIA for a development that uses such facilities for material supply or waste management.

17.7.6. A description of the potential streams and volumes of construction materials and waste disposal will be described within the 'Description of the Proposed Development' chapter of the ES. In addition, an Outline Construction Environmental Management Plan will be submitted in support of the DCO application. The Outline Construction Environmental Management Plan will set out how construction materials and waste would be managed on-site and how opportunities to recycle waste would be explored during the construction phase of Rosefield Solar Farm. Where reasonably practicable, development-specific commitments for sustainable resource management will be presented within the ES.

17.7.7. The Outline Construction Environmental Management Plan will include a Site Waste Management Plan which will incorporate measures to manage construction waste.

17.7.8. The removal of significant quantities of excavated arisings from the Site during construction is not anticipated, particularly as there are currently no demolition works proposed. There may be a need to remove some soils from the Site for treatment or disposal if found to be contaminated and it is not practical to treat this on-site. However, where reasonably practicable, soil arisings would be balanced through a cut and fill exercise to retain volumes on-site, which will be managed through the Outline Soil Management Plan.

17.7.9. For the operational (including maintenance) phase, the potential streams and volumes of construction materials and waste disposal will be described within the 'Description of the Proposed Development' chapter of the ES. There would be relatively little waste produced during the operational (including maintenance) phase and the requirement for material assets would be limited to maintenance and replacement parts, as required.

17.7.10. During decommissioning, any material assets and waste would be recycled or disposed of in accordance with good practice and market conditions at that time. If items can be recycled, this will be the first-choice option. An Outline Decommissioning Environmental Management Plan will be submitted in support of the DCO application. The Outline Decommissioning Environmental Management Plan will set out how the waste would be managed and detail opportunities for re-use and recycling during the decommissioning phase of Rosefield Solar Farm.

17.8. Transboundary effects

17.8.1. Regulation 32 of the EIA Regulations[11] requires the consideration of any likely significant effects on the environment of another European Economic Association State. The consideration of transboundary effects is also detailed within the Planning Inspectorate's Advice Note Seven[12].

[11] The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. Available online: https://www.legislation.gov.uk/uksi/2017/572/contents/made
[12] Planning Inspectorate (2020) Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environment Information and Environmental Statements (Version 7). Available online: https://www.gov.uk/government/publications/nationally-significant-infrastructure-projects-advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-an

17.8.2. Due to the nature and location of Rosefield Solar Farm, it is not anticipated that Rosefield Solar Farm would lead to any likely significant effects on the environment of another European Economic Association State.

18. Cumulative Effects

18.1. Introduction

18.1.1. This chapter presents the approach to the cumulative effects assessment, including preliminary consideration of the potential for cumulative effects and proposed actions to be completed as part of the ongoing EIA.

18.1.2. This chapter should be read in conjunction with the following figure presented in **Volume 2** and appendix presented in **Volume 3**:

- **Figure 18.1: Cumulative Long List Radius**;
- **Figure 18.2: Cumulative Developments within 500 m**; and
- **Appendix 18.1: Cumulative Long List**

18.1.3. Cumulative effects occur as a result of several actions on an environmental receptor, which may overlap or act in combination. The following types of cumulative effects have been considered in accordance with the EIA Regulations[1] and best practice guidance:

- **Intra-project combined effects** – the interaction and combination of different environmental residual (post-additional mitigation) effects from within Rosefield Solar Farm affecting a receptor; and
- **Inter-project cumulative effects –** the combined residual (post-mitigation) effects of Rosefield Solar Farm and another project or projects on a single receptor/resource.

18.2. Legislative framework, planning policy and guidance

18.2.1. The preliminary assessment has been undertaken with regard to the following legislation, planning policy and guidance.

Legislation

18.2.2. Schedule 4 paragraph (5)(e) of the EIA Regulations states that the ES should include "*a description of the likely significant effects of the development on the environment resulting from… the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the uses of natural resources*".

[1] The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. Available online: https://www.legislation.gov.uk/uksi/2017/572/contents/made

18.2.3. Regulation 5(2) of the EIA Regulations states that the ES must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on population and human health, biodiversity, land, soil, water, air and climate, material assets, cultural heritage and the landscape.

18.2.4. Regulation 5(2)(e) of the EIA Regulations refers to the need to assess "*the interaction between those factors.*"

National planning policy

- Overarching National Policy Statement for Energy (NPS EN-1) (2023)[2] – provides the basis for decisions regarding nationally significant energy infrastructure. There are multiple references to cumulative assessment including paragraph 4.1.5, which requires that potential adverse impacts, including any long-term and cumulative adverse impacts, as well as any measures to avoid, reduce, mitigate or compensate for any adverse impacts are considered;
- National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (2023)[3] – sets out the policies relating to electricity generation from renewable sources of energy and includes multiple references to cumulative assessment. Section 2.10 gives specific consideration to solar development including assessment of cumulative impacts;
- National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (2023)[4] – paragraph 2.9.10 makes reference to cumulative landscape and visual impacts where new overhead lines are required along with other related developments such as substations, wind farms and/or other new sources of power generation; and
- National Planning Policy Framework (NPPF) (2023)[5] - Section 49, 115, 160, 166, 191, 192 and 216 makes reference to ensuring adverse

[2] Department for Energy Security and Net Zero. (2023). Overarching National Policy Statement for Energy (EN-1). Available online: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1

[3] Department for Energy Security and Net Zero (2023). National Policy Statement for Renewable Energy Infrastructure (EN-3). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3

[4] Department for Energy Security and Net Zero (2023). National Policy Statement for Electricity Networks Infrastructure (EN-5). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5

[5] Ministry of Housing, Communities and Local Government and Department for Levelling Up, Housing and Communities (2023). National Planning Policy

cumulative effects are addressed appropriately, particularly related to highways, landscape and visual, flood risk, ground conditions and pollution, air quality, human health and the historic environment.

Guidance

18.2.5. There is no widely accepted methodology for assessing cumulative effects. However, relevant guidance has been considered during the preparation of this preliminary assessment and will also be employed in the production of the ES, comprising guidance from the Institute of Environmental Management and Assessment (IEMA)[6], and the assessment guidance set out in the Planning Inspectorate's Advice Note Seventeen[7] on inter-project cumulative effects.

18.3. Intra-project combined effects

18.3.1. There is the potential for the interaction and combination of different environmental residual effects from within Rosefield Solar Farm to affect certain receptors discussed in the assessments for more than one environmental factor.

18.3.2. The approach to the preliminary assessment of interactions of environmental effects (intra-project combined effects) has considered the changes in baseline conditions at common sensitive receptors (i.e., those receptors that have been identified as experiencing likely significant effects by more than one environmental factor) due to Rosefield Solar Farm.

18.3.3. The preliminary assessment has been based upon residual (post-additional mitigation) effects of '**slight/minor**' or greater significance only ('**negligible**' residual effects have not been considered). The preliminary assessment includes consideration of where multiple **not significant** effects could combine to become **significant**. The Study area for the preliminary assessment of intra-project combined effects has been informed by the Study areas for the individual environmental factor assessments.

Framework. Available online: https://www.gov.uk/government/publications/national-planning-policy-framework--2

[6] IEMA (2011) The State of Environmental Impact Assessment in the UK. Available online: [redacted]

[7] Planning Inspectorate (2019) Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects (Version 2). Available online: https://www.gov.uk/government/publications/nationally-significant-infrastructure-projects-advice-note-seventeen-cumulative-effects-assessment-relevant-to-nationally-significant-infrastructur

18.3.4. Preliminary consideration of the potential for intra-project combined effects between environmental factors has been undertaken to inform this PEIR and is reported in **Table 18.1** below.

18.3.5. A full assessment of the potential intra-project combined effects on environmental receptors will be undertaken and detailed within the ES. This will include a summary of the impact interactions and will set out how each of the environmental factor assessments have considered and assessed secondary effects arising as a result of the direct impacts from other environmental factors.

Table 18.1 – Preliminary assessment of intra-project combined effects

Environmental factor	Potential intra-project combined effects
Air quality	Intra-project combined effects could include, for example, effects on human receptors arising from air quality (dust), visual and noise impacts. However, at this stage it is not considered that there would be likely significant intra-project combined effects associated with this aspect of Rosefield Solar Farm.
Biodiversity	The effects on biodiversity and ecology identified already account for impacts arising from the various aspects of Rosefield Solar Farm, this is presented in **Chapter 7: Biodiversity**. There are various adverse effects from construction works and the operational phase of the project such as visual disturbance, dust, and noise and vibration, which, in combination, increase the magnitude of effect e.g., disturbance to breeding birds, wintering birds and foraging and commuting bats. The significance of these combined effects has been accounted for in this preliminary assessment. Similarly, planting proposed to mitigate landscape and visual effects would have a combined effect with biodiversity enhancement proposals, as landscaping works would also increase biodiversity value of the Site and would be located in areas that will would benefit existing habitats and designated sites through connectivity or buffering, and subsequently the species that these sites and habitats support. Therefore it is not considered that there would be likely significant adverse intra-project combined effects associated with this aspect of Rosefield Solar Farm.
Cultural heritage	Intra-project combined effects could include impacts on Listed Buildings (for example, pollution or dust may impact on the historic fabric of Listed Buildings, and Listed Buildings may be residential properties where residents may be impacted by amenity) and Conservation Areas (within which residential properties may be located where residents may be impacted by amenity) and the Registered Park and Garden at Claydon which

Environmental factor	Potential intra-project combined effects
	is also a tourist attraction and where visitors may be impacted by amenity. Such effects may also impact the ability to appreciate the heritage significance of the asset through changes to its setting or the contribution made to its significance by setting. At this stage, it is not considered that there would be likely significant intra-project combined effects associated with this aspect of Rosefield Solar Farm.
Land, soil and groundwater	Intra-project combined effects could arise, for example, from the synergy between the land, soils and groundwater assessment and the biodiversity and water assessments (presented in **Chapter 7: Biodiversity** and **Chapter 15: Water**, respectively). The potential changes in land use would be managed and any impacts to the land, soil quality and groundwater would be mitigated by measures documented within the Outline Soil Management Plan and the Outline Landscape and Ecological Management Plan that will be submitted in support of the DCO application. Therefore it is not considered that there would be likely significant intra-project combined effects associated with this aspect of Rosefield Solar Farm.
Landscape and visual	Some of the individual landscape features identified within this preliminary assessment (e.g. existing trees and hedgerows) also have biodiversity value and, in some cases, cultural or heritage value. When considering the significance of landscape effects on any such features, the biodiversity, cultural and heritage values associated with them have been taken into account. The landscape provides ecosystem services beyond purely the aesthetic and when considering the significance of effects on landscape character any biodiversity, recreational, cultural or heritage values associated with the landscape have been taken into account. It is recognised that there is the potential for the interaction and combination of residual effects identified in other environmental assessments presented in this PEIR to affect certain visual receptors discussed in **Chapter 11**. This could include, for example, effects on residential receptors and/or users of public rights of way arising from visual, noise and air quality (dust) impacts. However, at this stage it is not considered that there would be likely significant intra-project combined effects associated with this aspect of Rosefield Solar Farm.
Noise and vibration	Potential for intra-project combined effects during the construction phase resulting from noise generation, increase in

Environmental factor	Potential intra-project combined effects
	dust/air emissions and increased vehicles movements on the local road links. However, at this stage it is not considered that there would be likely significant intra-project combined effects associated with this aspect of Rosefield Solar Farm.
Population	There is potential for intra-project combined effects on the amenity of residents, businesses and users of public rights of way and community facilities to be impacted by noise, air quality, visual and traffic effects arising from the construction and operation (including maintenance) of Rosefield Solar Farm. It is recognised that there is potential for intra-project effects associated with the potential significant heritage impacts to Clayton House (presented within **Chapter 9: Cultural Heritage**) and adverse effects on tourism and business revenue in the local area. However, at this stage it is not considered that there would be likely significant intra-project combined effects associated with this aspect of Rosefield Solar Farm.
Transport and access	Intra-project combined effects could include impacts on public rights of way. Conversely, the emissions from construction traffic are a source of effects for multiple receptors related to other environmental assessments, including air quality, noise and vibration, and biodiversity. However, at this stage it is not considered that there would be likely significant intra-project combined effects associated with this aspect of Rosefield Solar Farm.
Water	Intra-project combined effects could include impacts on water receptors due to mobilisation of soils during construction. However, at this stage it is not considered that there would be likely significant intra-project combined effects associated with this aspect of Rosefield Solar Farm.
Glint and glare	Intra-project combined effects could include visual impacts on residential properties and users of public rights of way. However, at this stage it is not considered that there would be likely significant intra-project combined effects associated with this aspect of Rosefield Solar Farm.

18.3.6. The full assessment of intra-project combined effects, to be presented in the ES, will be undertaken using a two-stage approach:

Stage 1: Screening

18.3.7. Screening will be undertaken to determine whether a sensitive receptor is exposed to more than one type of residual (post-additional mitigation) effect during the construction, operational (including maintenance) and/or decommissioning phases of Rosefield Solar Farm. Those common sensitive receptors exposed to two or more types of residual (post-additional mitigation) effects with significance of '**slight/minor**' or greater, will be taken forward to Stage 2 of the assessment.

18.3.8. If there is only one type of effect on a sensitive receptor (i.e., only one environmental factor assessment has identified effects on that sensitive receptor), then it will be considered that there are no potential intra-project combined effects and the sensitive receptor will not be taken forward to Stage 2 of the assessment.

Stage 2: Assessment of intra-project combined effects

18.3.9. A quantitative assessment of the overall significance of the intra-project combined effects on common sensitive receptors identified at Stage 1 will be undertaken, based on technical information provided in the environmental factor assessments and supporting appendices, as well as professional judgement. Given that the types of effects may be very different in some cases, a quantitative assessment may not be possible, and it may be necessary to apply professional judgement in determining the significance of each individual effect.

18.3.10. The evaluation at the receptor level will consider:

- the magnitude of change at the common receptor;
- previously identified sensitivity/importance/value;
- duration and reversibility of interaction.

18.3.11. The focus will be on determining a change in the level of effect likely to be experienced and whether this is significant or not.

18.4. Inter-project cumulative effects

18.4.1. The ES will include an assessment of the potential effects of Rosefield Solar Farm in the context of other existing development and/or approved development(s), as detailed below, to determine the cumulative effects that may result from Rosefield Solar Farm and the other existing development and/or approved development(s) on the same receptor or environmental factor.

18.4.2. The approach to the assessment of inter-project cumulative effects will consider the deviation from the baseline conditions at common sensitive receptors as a result of changes brought about as a result of Rosefield Solar Farm in combination with one or more other existing development

and/or approved developments. The assessment of the inter-project cumulative effects will be based upon the residual (post-additional mitigation) effects that have been identified in the various environmental factor assessments for Rosefield Solar Farm, as well as available environmental information for the other existing development and/or approved developments.

18.4.3. In accordance with the Planning Inspectorate's Advice Note Seventeen[8], the identification of other existing development and/or approved developments comprises two clear stages, as follows:

- **Stage 1**: establish a long list of other existing development and/or approved developments based on appropriate spatial and temporal limits.
- **Stage 2**: apply a clear rationale to establish a short list of other existing development and/or approved developments which, in combination with Rosefield Solar Farm, have the potential to result in a significant cumulative effect for inclusion within the assessment.

18.4.4. For the purposes of this preliminary assessment, Stages 1 and 2 have been completed in order to identify a preliminary short list of other existing developments and/or approved developments to inform a high level overview of potential inter-project cumulative effects.

Stage 1: Long list methodology

18.4.5. In accordance with the Planning Inspectorate's Advice Note Seventeen, the first task in establishing the long list of relevant other existing development and/or approved development(s) is to determine the 'search area'. For the purposes of this preliminary assessment, the 'search area' has been determined by affording consideration to the Zone of Influence (ZoI) for each environmental factor assessed within this PEIR.

18.4.6. The ZoI for each environmental factor is defined as the spatial area over which an effect is likely to be experienced. The ZoI for each environmental factor has been identified based on the extent of the likely effects as identified as the Study area in each of the individual environmental factor assessments (**Chapters 6** to **16**), whilst also reflecting any additional area over which cumulative effects may occur for particular cumulative scenarios (e.g., sequential cumulative visual effects on users of linear routes).

[8] Planning Inspectorate (2019) Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects (Version 2). Available online: https://www.gov.uk/government/publications/nationally-significant-infrastructure-projects-advice-note-seventeen-cumulative-effects-assessment-relevant-to-nationally-significant-infrastructur

18.4.7. The environmental factor-specific Study areas presented in **Chapters 6** to **16**, and appropriate justifications for these Study areas, are provided below in **Table 18.2**.

Table 18.2 – Zone of influence for each environmental factor

Environmental factor	Study area	Justification
Air quality	250 m from the Site boundary and 50 m from the edge of the roads likely to be affected by trackout.	Based on the Institute of Air Quality Management (IAQM) construction dust guidance (IAQM, 2024)[9], the Study area for sensitive human receptors for demolition, earthworks and general construction activities is up to 250 m from the Site boundary. For trackout[10] activities, the Study area is up to 50 m from the edge of the roads likely to be affected by trackout. The Study area for sensitive ecological receptors for demolition, earthworks and general construction activities is up to 50 m from the Site boundary. For trackout activities, the Study area is up to 50 m from the edge of the roads likely to be affected by trackout.
Biodiversity	2 km from the Site boundary (extended to 10 km in certain circumstances)	Background data searches for statutory and non-statutory designated sites and protected species records focus on the Site and a 2 km buffer, extended to 10 km for Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Ramsar sites.
Cultural heritage	10 km from the Site boundary	The ZTVs presented in **Figure 10** in **Volume 3 Appendix 9.1** demonstrates that any visibility of the Rosefield Solar Farm would be limited to a maximum distance of 5 km from the Site boundary. In theory, there could be in combination effects to heritage assets within this distance of the Site as a result of other developments of a similar height within 5 km of the asset and the Study area for

[9] Institute of Air Quality Management. Guidance on the assessment of dust from demolition and construction. (2024). Available online: [redacted]

[10] Trackout is defined as the transport of dust and dirt from the construction/demolition sites onto public road network, where it may be deposited and then re-suspended by vehicles using the network.

Environmental factor	Study area	Justification
		cultural heritage is therefore set at 10 km from the Site boundary.
Climate	Not applicable (global)	Greenhouse gas (GHG) emissions are inherently cumulative, where the sensitive receptor is the global climate. As such, it is not possible to define a Study area for the assessment of cumulative effects on GHG emissions.
Landscape and visual	10 km from the Site boundary	The ZTVs presented in **Figure 11.7 – 11.14** in **Volume 2** demonstrate that any visibility of Rosefield Solar Farm could potentially extend beyond 6 km from the Site. In theory, sequential cumulative visual effects on users of linear routes (e.g. roads or long distance recreational footpaths) could be influenced by developments beyond the Study area of Rosefield Solar Farm itself. In order to consider this scenario, the Study area for the cumulative assessment is set at 10 km from the Site boundary. It is considered that sequential cumulative visual effects on users of linear routes at greater distances would be no greater than negligible due to the considerable separation distances.
Land, soils and groundwater (excluding BMV agricultural land)	1 km from the Site boundary	A 1 km Study area has been considered with regard to identifying land, soil and groundwater related receptors that could be impacted by the construction, operation (including maintenance) and/or decommissioning of Rosefield Solar Farm.
Noise and vibration	300 m from the Site boundary (for construction and decommissioning phases). All road links used for construction traffic. Approximately 1 km from the Site	The Study area for the construction and decommissioning phase assessments considers noise and vibration sensitive receptors that are located within 300 m of the Site boundary. This has been determined based on the guidance set out in BS 5228-1:

Environmental factor	Study area	Justification
	boundary (for the operational (including maintenance) phase)	2009+A1:2014 and BS 5228-2:2009+A1: 2014[11]. The influence of cumulative traffic flows during the construction phase will consider all road links to be used by Rosefield Solar Farm. For the assessment of cumulative operational (including maintenance) phase noise levels, a 1 km Study area buffer from the Site boundary has been adopted. Beyond this distance, the contribution of noise emissions is unlikely to be significant.
Population	500 m 'Study area' extending from the Site boundary in all directions whilst also including the full area of the Site itself.	This Study area is in line with Design Manual for Roads and Bridges LA 112[12]. The assessment of cumulative effects will be based on this same Study area.
Traffic and transport	Extent of the local road network including: A41, Station Road / Dewes Lane, Snake Lane / Fiddlers Field, Claydon Road and Granborough Road.	Extent of the local road network affected by the construction, operation (including maintenance) and decommissioning phases, as well as any identified sensitive receptors. This Study area has been identified assuming that all construction traffic routes to Rosefield Solar Farm will follow these links for access.

[11] BSI Standards Publication BS 5228-1:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites. Part 1- Noise. Available online: untitled (warrington.gov.uk).
[12] Design Manual for Roads and Bridges (2019). LA 112 Population and Human Health. Available at:

Environmental factor	Study area	Justification
Water	1 km from the Site boundary	A 1 km Study area has been considered with regard to identifying hydrological features and surface water related receptors that could be impacted by the construction, operation (including maintenance) and/or decommissioning of Rosefield Solar Farm.
Glint and glare	1 km from the Site boundary for residential dwellings and roads. 10 km from the Site boundary for aviation receptors. 500 m from the Site boundary for railway signals and drivers.	There is little formal guidance with regard to the maximum distance at which glint and glare should be assessed. However, based on industry best practice and professional judgement, a 1 km distance from the Site boundary has been used for ground based receptors (including residential dwellings and roads), a 10 km distance for aviation receptors, and 500 m for railway signals and drivers for the operational (including maintenance) phase.

18.4.8. The overall combined 'search area' for the long list of relevant other existing development and/or approved development(s) has been based on the largest ZoI (Study area) in terms of distance, which in this case is 10 km, which is the Study area for internationally designated sites for the preliminary biodiversity assessment (refer to **Chapter 7**), cultural heritage (see **Chapter 9**), landscape and visual (see **Chapter 11**) and glint and glare (see **Chapter 16**).

18.4.9. Following the adoption of the 10 km ZoI, a planning application search was undertaken to identify other existing development and/or approved developments within the 10 km ZoI, using the planning portals of Buckinghamshire Council, Cherwell District Council and the Planning Inspectorate.

18.4.10. The 10 km ZoI extends from the 'bounding circle' which surrounds the Site boundary of Rosefield Solar Farm, as presented in **Figure 18.1** in **Volume 2**, to ensure all other existing development and/or approved developments within 10 km of Rosefield Solar Farm were identified. The central National Grid Reference point of other existing development and/or approved developments has been used to determine their location, in the absence of an application boundary in GIS format.

18.4.11. Only the following types of other existing developments and/or approved developments have been considered for inclusion on the long list, as the Applicant considers that any development that does not fall within these

types would not likely give rise to a significant cumulative effect, unless otherwise specified:

- Employment developments;
- Residential developments of 10+ dwellings;
- Minerals and waste applications;
- Industrial developments;
- NSIP developments[13];
- Transport infrastructure developments (trunk roads or motorways only); and
- Energy infrastructure developments.

18.4.12. Of the development types listed above, only those that meet one or more of the following criteria have been included on the long list (in accordance with the 'Tier 1' and 'Tier 2' descriptions in Table 2 of the Planning Inspectorate's Advice Note Seventeen):

- Projects that are under construction but that will not be completed prior to Rosefield Solar Farm commencing (N.B. in accordance with Table 2 of the Planning Inspectorate's Advice Note Seventeen, other projects that are expected to be completed before construction of Rosefield Solar Farm, and the effects of those projects have been fully determined within their respective applications, are considered as part of the baseline);
- Projects with planning permission within the last five years (whether under the Planning Act 2008 or other regimes), but not yet implemented;
- Submitted applications (whether under the Planning Act 2008 or other regimes), but not yet determined; and
- Projects on the Planning Inspectorate's Programme of Projects where an EIA Scoping Report has been submitted, but for which an application has not yet been submitted.

18.4.13. The Applicant's interpretation of the last bullet point above is that this solely relates to NSIPs. However, the Applicant has chosen to widen this particular criterion to include projects screened as EIA development under other regimes where an EIA Scoping Report has been submitted, but for which an application has not yet been submitted.

18.4.14. It should be noted that with reference to 'Tier 3' descriptions in Table 2 of the Planning Inspectorate's Advice Note Seventeen, the following other

[13] As defined by the Planning Act 2008 (as amended). Available online: https://www.legislation.gov.uk/ukpga/2008/29/contents

existing development and/or approved development(s) have not been considered for inclusion in the long list. None of the below will have sufficient environmental assessment information freely and publicly available to inform the inter-project cumulative effects assessment, nor are any of the below considered by the Applicant to be 'existing development and/or approved development':

- Projects on the Planning Inspectorate's Programme of Projects where an EIA Scoping Report has not been submitted;
- Projects that have been identified in the relevant Development Plan(s) (and emerging Development Plans); and
- Projects identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.

18.4.15. Consideration has also been given to other existing developments and/or approved developments that have been identified through consultation with stakeholders including National Grid and Buckinghamshire Council. For example, the expansion of East Claydon Substation does not meet the above criteria; however, as it is integral to the development of Rosefield Solar Farm, a preliminary assessment has been included within this chapter.

18.4.16. The long list of other existing development and/or approved developments is provided in **Appendix 18.1** in **Volume 3**. This long list will be kept under review and agreed with Buckinghamshire Council prior to the completion of the ES to allow for a robust assessment of cumulative effects. The information provided in **Appendix 18.1** is accurate as of 30 July 2024.

Stage 2: Short list methodology

18.4.17. Following the formation of the long list, the eligible other existing developments and/or approved developments identified have been through further assessment (Stage 2) to establish a short list of other existing development and/or approved developments which, in combination with Rosefield Solar Farm, have the potential to result in significant cumulative effects.

18.4.18. The criteria used to determine whether to include or exclude an existing development and/or approved development on the short list reflects the process established by the Planning Inspectorate's Advice Note Seventeen and has regard to relevant policy and guidance documents and consultation with the appropriate statutory consultation bodies (particularly Buckinghamshire Council). The Planning Inspectorate's Advice Note Seventeen states that the criteria should address the following:

- *"**Temporal scope**: The applicant may wish to consider the relative construction, operation and decommissioning programmes of the 'other existing development and/or approved development' identified in the*

ZOI together with the programme, to establish whether there is overlap and any potential for interaction.

- ***Scale and nature of development**: The applicant may wish to consider whether the scale and nature of the 'other existing development and/or approved development' identified in the ZOI are likely to interact with the proposed development. Statutory definitions of major development and EIA screening thresholds may be of assistance when considering issues of scale.*
- ***Other factors**: The applicant should consider whether there are any other factors, such as the nature and/or capacity of the receiving environment that would make a significant cumulative effect with 'other existing development and/or approved development' more or less likely and may consider utilising a source-pathway-receptor approach to inform the assessment.*
- ***Documentation: The Cumulative Effects Assessment shortlisting process may be** documented using Matrix 1 (Appendix 1) (N.B. Appendix 18.1 in Volume 3 adopts the structure and format of Matrix 1). The reasons for excluding any development from further consideration should be clearly recorded. This will provide decision makers, consultation bodies and members of the public with a clear record of 'other existing development and/or approved development' considered and the applicant's decision making process with respect to the need for further assessment."*

18.4.19. The Planning Inspectorate's Advice Note Seventeen suggests that professional judgement may also be used to supplement the threshold criteria and in order to avoid excluding other existing development and/or approved development that is:

- *"Below the threshold criteria limits but has characteristics likely to give rise to a significant effect; or*
- *Below the threshold criteria limits but could give rise to a cumulative effect by virtue of its proximity to the proposed NSIP [i.e. Rosefield Solar Farm]".*

18.4.20. The Planning Inspectorate's Advice Note Seventeen also notes:

- *"Similarly, professional judgement could be applied to support excluding 'other existing development and/or approved development' that exceeds the thresholds but may not give rise to discernible effects. All of the 'other existing development and/or approved development' considered should be documented and the reasons for inclusion or exclusion should be clearly stated."*

18.4.21. Taking the above into consideration, the other existing development and/or approved developments on the long list have been reviewed against the following criteria to form the short list of other existing development and/or approved developments:

- **Criteria 1**: The other existing development and/or approved development has a construction, operational and/or decommissioning phase that overlaps with any phase of Rosefield Solar Farm;
- **Criteria 2**: The other existing development and/or approved development and Rosefield Solar Farm share common sensitive receptors/resources which are assessed and described in the supporting environmental documentation, and have the potential to be significantly affected by the combination of the other existing development and/or approved development and Rosefield Solar Farm;
- **Criteria 3**: The other existing development and/or approved development has sufficient environmental assessment information freely and publicly available (including traffic flows) to inform the inter-project cumulative effects assessment. The assessment of each existing development and/or approved development on the short list will be proportionate to the environmental assessment information available (N.B: An attempt will not be made to determine the potential environmental effects of another development to inform the inter-project cumulative effects assessment. If there is an existing development and/or approved development that it is known will be progressed but has insufficient environmental assessment information, it still may be prudent to consider it in the inter-project cumulative effects assessment. This might take the form of listing the project and why it hasn't been considered in detail, or the potential cumulative effect could be discussed at a high level (qualitatively) using professional judgement).

18.4.22. The Applicant notes that the Planning Inspectorate has agreed that transport and access matters are treated differently due to the temporary nature of traffic effects. Therefore, for transport and access only, consideration will only be afforded to other existing development and/or approved developments that have been determined.

18.4.23. Where an existing development and/or approved development meets all of the above criteria, it has been included on the 'short list' and will be taken forward for further consideration in the assessment. The 'short list' is detailed below in **Table 18.3**. This short list will be kept under review and agreement sought with Buckinghamshire Council prior to the completion of the ES to allow for a robust assessment of cumulative effects. Note that the identification numbers in the first column of **Table 18.3** correspond with those in **Appendix 18.1** in **Volume 3**.

Table 18.3: Short list of other existing development and/or approved development

ID	Application reference	Planning regime	Brief description	Distance from Rosefield Solar Farm	Status
0	N/A	Town and Country Planning Act 1990	Expansion of the existing East Claydon National Grid Substation	Located within the bounding circle as outlined in **Figure 18.1** and **Figure 18.2** in **Volume 2**	Pre-application
1	19/00983/APP Tuckey Farm	Town and Country Planning Act 1990 Buckinghamshire Council	Ground mounted solar farm, ancillary infrastructure and associated works including the diversion of public rights of way and landscape planting	Located within the bounding circle as outlined in **Figure 18.1** and **Figure 18.2** in **Volume 2**	Approved
2	23/03875/APP Rookery Farm	Town and Country Planning Act 1990 Buckinghamshire Council	Development of a battery energy storage system (BESS), connected directly to the national grid with associated infrastructure including access, drainage, and landscaping	Located within the bounding circle as outlined in **Figure 18.1** and **Figure 18.2** in **Volume 2**	Pending decision
3	Hybrid Bill	High Speed Rail Act 2017	High Speed Rail 2 ('HS2')	Located within the bounding circle as outlined in **Figure 18.1** and **Figure 18.2** in **Volume 2**	Approved – Construction ongoing

ID	Application reference	Planning regime	Brief description	Distance from Rosefield Solar Farm	Status
4	TWA/18/APP/04	Buckinghamshire Council	East West Rail	Located within the bounding circle as outlined in **Figure 18.1** and **Figure 18.2** in **Volume 2**	Ongoing
5	CM/0016/21 Calvert Solar Park	Town and Country Planning Act 1990 Buckinghamshire Council	Application for the construction of solar array / solar park comprising of ground mounted solar PV panels and associated works	Located within the bounding circle as outlined in **Figure 18.1** and **Figure 18.2** in **Volume 2**	Pending decision
6	21/02851/AOP Grendon Prison	Town and Country Planning Act 1990 Buckinghamshire Council	Outline planning application with all matters reserved except for access, layout, and scale for the construction a new category C prison (up to 67,000 sqm GEA) within a secure perimeter fence together with access, parking, landscaping and associated engineering works	1.7 km (see **Figure 18.2** in **Volume 2**)	Approved (following appeal)
9	21/04112/OUT	Town and Country Planning Act 1990	Outline application for the erection of up to 65 dwellings, including up to 8 live-work dwellings (use class sui	8.2 km	Approved (appeal)

ID	Application reference	Planning regime	Brief description	Distance from Rosefield Solar Farm	Status
		Cherwell District Council	dwellings (use class sui generis), public open space, access, infrastructure and demolition of existing buildings (all matters reserved except principle means of access from Station Road)		
10	22/03873/F	Town and Country Planning Act 1990 Cherwell District Council	Installation and operation of a renewable energy generating station comprising ground-mounted photovoltaic solar arrays and battery-based electricity storage containers together with a switchgear container, inverter/transformer units, site access, internal access tracks, security measures, access gates, other ancillary infrastructure and landscaping and biodiversity enhancements	8.3 km	Refused In appeal period
11	24/00949/F	Town and Country Planning Act 1990	Siting of battery storage facility; substation for the connection of the BESS to the grid; ancillary	9 km	Pending decision

ID	Application reference	Planning regime	Brief description	Distance from Rosefield Solar Farm	Status
		Cherwell District Council	equipment; security fencing; landscaping and vehicular access alterations.		
12	21/03558/OUT	Town and Country Planning Act 1990 Cherwell District Council	Outline application for residential development for up to 250 dwellings including affordable housing and ancillary uses including retained Local Wildlife Site, public open space, play areas, localised land remodelling, compensatory flood storage, structural planting and access	9.4 km	Approved
13	21/01224/OUT	Town and Country Planning Act 1990 Cherwell District Council	Outline planning application for Automotive Experience Quarter comprising Commercial, Business and Services uses (Class E), Light Industrial (Class B2), Local Community and Learning Uses (Class F) and vehicle circuits (Sui Generis) with all matters reserved aside from that of access)	9.6 km	Approved

ID	Application reference	Planning regime	Brief description	Distance from Rosefield Solar Farm	Status
14	15/00314/AOP	Town and Country Planning Act 1990 Buckinghamshire Council	Outline planning application with all matters reserved except for access for a mixed-use sustainable urban extension on land to the south west of Milton Keynes to provide up to 1,855 mixed tenure dwellings, an employment area, a neighbourhood centre, and a primary and secondary school.	9.7 km	Approved

18.4.24. Where other existing developments and/or approved developments have been discounted from the short list, they will continue to be monitored to ensure that any changes to those developments are identified and their omission from the short list is reassessed prior to undertaking the cumulative assessment for the ES.

Stage 3: Information gathering

18.4.25. The other existing developments and/or approved developments that form part of the short list will be subject to a review of environmental information, where available, including details of:

- Location;
- Programme, including construction, operation (including maintenance) and decommissioning;
- Baseline data;
- Effects arising from such other developments; and
- Proposed design.

Stage 4: Assessment

18.4.26. A full cumulative assessment will be reported in the ES. Should likely significant cumulative effects be identified, consideration will be given to additional mitigation to avoid, prevent, reduce or, if possible, offset any identified significant adverse cumulative effects.

18.4.27. There is no formal guidance on the criteria for determining significance of cumulative effects. For the full assessment to be presented in the ES, the following principles will be considered when assessing the significance of inter-project cumulative effects, in accordance with the Planning Inspectorate's Advice Note Seventeen and in consideration of any mitigation measures required to avoid, prevent, reduce or, if possible, offset any identified significant adverse cumulative effects:

- Is there an inter-project cumulative effect on any receptors/resources;
- The duration and frequency of the effects;
- The nature of the receptors/resources affected;
- How the impacts identified combine to affect the condition of the receptor/resource;
- The probabilities of the impacts occurring in relation to each other in such a way so as to produce a cumulative effect, considering the extent and duration of the impact change;
- The ability of the receptor/resource to absorb further impacts; and
- Is the level of effect different to that considered at the project level and is the cumulative effect significant or not.

18.5. Preliminary inter-project cumulative assessment

18.5.1. This section presents a high-level overview of potential cumulative effects based on the short-listed other existing and/or approved developments presented in **Table 18.3**. Detailed assessment of inter-project cumulative effects will be included within the ES.

Air quality

18.5.2. With respect to air quality, potential inter-project cumulative effects could include additional construction dust impacting on receptors within 250 m of the Site boundary and cumulative construction traffic along the same route that construction traffic from Rosefield Solar Farm will take. However, at this stage of the assessment, construction details of other developments are not available therefore, a worse case assumption has been presented.

18.5.3. The following other existing and/or approved developments have the potential to have cumulative effects on air quality (see **Figure 18.2** in **Volume 2**):

- National Grid East Claydon Substation Extension;
- Proposed solar farm at Tuckey Farm (19/00983/APP);
- HS2 (and associated applications);
- East West Rail;
- Grendon Prison (21/02851/AOP); and
- Rookery Farm BESS (23/03875/APP).

Biodiversity

18.5.4. With respect to biodiversity, the following receptors have been identified as having the potential to experience inter-project cumulative effects when considering the other existing and/or approved developments detailed in **Table 18.3**:

- Foraging and commuting bats;
- Roosting bats;
- Black and brown hairstreak butterfly;
- Ground nesting birds; and
- Wintering birds.

18.5.5. These receptors are likely to experience the following inter-project cumulative effects:

- Habitat loss (land take);
- Habitat fragmentation (including connectivity);
- Incidental mortality of species; and

- Disturbance effects (comprising light, noise and visual disturbance).

18.5.6. The following other existing and/or approved developments have the potential to result in inter-project cumulative effects relating to the biodiversity receptors and impacts outlined above (see **Figure 18.2** in **Volume 2**):

- National Grid East Claydon Substation Extension;
- Proposed solar farm at Tuckey Farm (19/00983/APP);
- Grendon Prison (21/02851/AOP);
- Rookery Farm BESS (23/03875/APP);
- HS2 (and associated applications); and
- East West Rail.

18.5.7. The other existing and/or approved developments detailed in **Table 18.3** that are not listed above are considered unlikely to result in inter-project cumulative effects on biodiversity receptors. This is due to a number of reasons, including the distance of the other existing and/or approved developments from Rosefield Solar Farm, poor habitat connectivity, and the mitigation measures outlined for each of these other existing and/or approved developments that will likely result in no or negligible effects on biodiversity receptors.

Climate

18.5.8. GHG emissions are a unique type of impact that demands consideration in a different manner to the other types of impact. GHG emissions are inherently cumulative; no specific impact location or magnitude can be attributed to a particular emission and all emissions have the same impact on the same ultimate receptor. The impact is climate change, or global warming, caused by the radiative forcing effects of GHGs in the atmosphere. The affected receptor is the global climate and all the ecosystems and biomes that depend on it.

18.5.9. Emissions from nearby and associated developments will have a cumulative effect with those from any GHG-emitting activity both nationally, and indeed globally. Therefore, aligned with IEMA guidance[14], it is not appropriate to consider the effects of GHG emissions from specific other existing and/or approved developments in the nearby area, as there is no basis for selecting any particular development over any other. However, consideration will be afforded to the National Grid East Claydon Substation within the ES.

[14] Institute of Environmental Management and Assessment (2022) Assessing Greenhouse Gas Emissions and Evaluating their Significance. Available online: [redacted]

Cultural heritage

18.5.10. With respect to cultural heritage, the following other existing and/or approved developments has the potential to result in inter-project cumulative effects with Rosefield Solar Farm as a result of changes to the wider landscape setting of Grade II listed Finemerehill House (NHLE 1117815) and the contribution this makes to its significance:

- HS2 (and associated applications)

18.5.11. Other existing and/or approved developments detailed in **Table 18.3** that are not listed above are considered unlikely to result in inter-project cumulative effects on cultural heritage receptors. This is due to a number of reasons, including the distance of the other existing and/or approved developments from Rosefield Solar Farm and the lack of invisibility or other connections with the heritage assets in the area.

Land, soil and groundwater

18.5.12. With respect to land, soil and groundwater, the only receptors for which potentially significant effects have been predicted are soil and agricultural land. Where soil of Grade 3a (good quality) is present, a slight or moderate significance of effect was identified during the construction phase for Rosefield Solar Farm. Given the assumption that several of the other existing and/or approved developments, as listed below, will result in the sterilising of soil resources to some degree, these other existing and/or approved developments have the potential to result in inter-project cumulative effects relating to soil and agricultural land when this resource is considered on a local level (i.e. within Buckinghamshire) (see **Figure 18.2** in **Volume 2**):

- National Grid East Claydon Substation Extension;
- Proposed solar farm at Tuckey Farm (19/00983/APP);
- HS2;
- East West Rail;
- Rookery Farm BESS (23/03875/APP);
- Calvert Landfill Solar Park (CM/0016/21); and
- BESS facility (24/00949/F).

Landscape and visual

18.5.13. With respect to landscape and visual, the following other existing and/or approved developments have the potential to result in inter-project cumulative effects as a result of changes to landscape and/or visual amenity (see **Figure 18.2** in **Volume 2**):

- National Grid East Claydon Substation Extension;
- Proposed solar farm at Tuckey Farm (19/00983/APP);

- HS2 (and associated applications);
- East West Rail;
- Grendon Prison (21/02851/AOP); and
- Rookery Farm BESS (23/03875/APP).

18.5.14. These other existing and/or approved developments are located within the Zone of Theoretical Visibility (ZTV) for Rosefield Solar Farm and could give rise to locally significant effects on landscape character and visual receptors lying between the proposed sites. If the projects were constructed in tandem, it is likely that the cumulative landscape and visual effects in the tracts of the landscape described would be greater than if the projects were constructed in isolation. Therefore, assuming a worst case scenario, it is possible that significant cumulative landscape and visual effects may arise.

Noise and vibration

18.5.1. With respect to noise and vibration, the following other existing and/or approved developments have the potential to result in inter-project cumulative effects (see **Figure 18.2** in **Volume 2**):

- National Grid East Claydon Substation Extension;
- Rookery Farm BESS (23/03875/APP);
- Proposed solar farm at Tuckey Farm (19/00983/APP);
- HS2 (and associated applications); and
- East West Rail.

18.5.2. From the other existing and/or approved developments listed above, the operational phase noise levels generated by the National Grid East Claydon Substation Extension and Rookery Farm BESS have the potential to act cumulatively with Rosefield Solar Farm at a limited number of sensitive receptors within the Study area. As a result, it is possible that a significant inter-project cumulative noise effect may arise during the operational (including maintenance) phase. Construction phase inter-project cumulative effects are not expected at receptors common to these three developments.

18.5.3. The proposed solar farm at Tuckey Farm is located to the north-east of the Rosefield Solar Farm (see **Figure 18.2** in **Volume 2**). Based on the location and layout of Tuckey Farm solar farm, it is not anticipated that the proposed noise emitting plant/equipment will make a significant inter-project cumulative noise contribution at the sensitive receptors in the vicinity of Rosefield Solar Farm. On this basis, significant inter-project cumulative effects are not anticipated.

18.5.4. HS2 is located to the south-west of Parcel 1 and Parcel 2 of Rosefield Solar Farm (see **Figure 18.2** in **Volume 2**) and as a result, there is potential for inter-project cumulative noise levels. For noise sensitive receptors in the vicinity of Parcel 1 and Parcel 2, the predicted operational (including maintenance) phase noise levels from Rosefield Solar Farm are predicted to be considerably lower

than the noise generated by HS2; on this basis, significant inter-project cumulative effects are not anticipated.

18.5.5. Given the separation distance from East West Rail and the predicted Rosefield Solar Farm noise levels at receptors north of Parcel 1, it is not anticipated that there will be any significant inter-project cumulative effects.

Population

18.5.6. The only receptor identified in the preliminary population assessment (**Chapter 13**) for Rosefield Solar Farm that may experience any level of effect is public rights of way, in which there is the potential for a **slight adverse** and **moderate adverse** effects. As a result of a diversion to the existing public right of way at Field E11, the residual effect is **slight adverse**. The diversion proposed south west of Shrubs Wood is of such a distance that there may be a **significant** effect. None of the other existing and/or approved developments in **Table 18.3** are anticipated to lead to any changes to the public right of way network within the defined Study area or within 1 km of Site boundary. Therefore, no inter-project cumulative effects are expected.

18.5.7. There is potential for a cumulative impact on agricultural business however, this will be assessed in detail in the ES once further information is available.

Transport and access

18.5.8. The addition of cumulative traffic flows will increase the baseline traffic level that Rosefield Solar Farm traffic will be measured against. As such, the percentage impact of construction traffic on the Study area network will be reduced.

18.5.9. The cumulative review will consider overall road link capacity. However, the potential impact of other existing and/or approved developments together with Rosefield Solar Farm construction traffic is highly unlikely to affect network capacity.

18.5.10. The access route for Rosefield Solar Farm is not shared with the other existing and/or approved developments listed in **Table 18.3** and as such, there are unlikely to be further inter-project cumulative effects within the Study area. Should this situation change, any inter-project cumulative effects can be managed through the Outline Construction Traffic Management Plan. The Outline Construction Traffic Management Plan will be submitted in support of the DCO application. A Construction Traffic Management Plan would be secured pursuant to the DCO as a requirement, and in accordance with the outline plan.

Water

18.5.11. With respect to water, the other existing and/or approved developments listed in **Table 18.3** are considered unlikely to result in inter-project cumulative effects with Rosefield Solar Farm. This is due to a number of factors, including the distance of the other existing and/or approved developments from Rosefield

Solar Farm, and Rosefield Solar Farm being positioned in mostly Flood Zone 1 and within an area at low risk of flooding from other sources. Mitigation measures outlined for each of the other existing and/or approved developments will likely result in no or negligible effects on water resource and flood risk receptors.

18.5.12. The main common thread with respect to the identified other existing and/or approved developments is the requirement to limit offsite surface water discharges to greenfield rates (where an effect is identified) that will mimic the natural runoff scenario and ensure no increase in flood risk either onsite or downstream.

Glint and glare

18.5.13. With respect to glint and glare, HS2 and East West Rail have the potential to result in inter-project cumulative effects with Rosefield Solar Farm; however such effects are considered unlikely due to the HS2 railway being constructed within an embankment.

18.6. Difficulties and uncertainties

18.6.1. The assessment of inter-project cumulative effects will be limited to publicly available information obtained from the relevant planning applications on the planning portals of Buckinghamshire Council, Cherwell District Council and the Planning Inspectorate. For some of the short-listed other existing developments and/or approved developments, relevant information to inform this assessment may not be available.

18.7. Further work to inform the ES

18.7.1. The long list and short list of other existing development and/or approved developments presented within this chapter have not been finalised and agreed at this stage. Further consultation with Buckinghamshire Council to agree the final short list for inclusion in the ES will be undertaken.

18.7.2. Any other existing development and/or approved developments that are identified will be considered as part of the long list and a decision will be taken in accordance with the methodology detailed in **Section 18.4** to determine whether a particular development will be included in the short list. An assessment cut-off date will be reported within the ES, as advised in the Planning Inspectorate's Advice Note Seventeen[15].

[15] Planning Inspectorate (2019) Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects (Version 2). Available online: https://www.gov.uk/government/publications/nationally-significant-infrastructure-projects-advice-note-seventeen-cumulative-effects-assessment-relevant-to-nationally-significant-infrastructur

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Solar Farm

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Appendix I-1.2- Volume 5 - Non-Technical Summary

Rosefield Solar Farm

Preliminary Environmental Information Report

Non-Technical Summary

September 2024

Table of Contents

1. Introduction 1
   1.1. Background 1
   1.2. Environmental Impact Assessment 1
   1.3. Purpose of this Non-Technical Summary 1
2. Rosefield Solar Farm 3
   2.1. Location 3
   2.2. Project description 3
   2.3. Existing land use 4
   2.4. Environmental designations 4
   2.5. Need for Rosefield Solar Farm 7
   2.6. Alternatives considered 7
   2.7. Construction of Rosefield Solar Farm 9
   2.8. Environmental constraints and opportunities 9
3. Approach to the Environmental Impact Assessment 12
   3.1. Environmental Impact Assessment Process 12
4. Assessment findings 14
   4.1. Air Quality 14
   4.2. Biodiversity 14
   4.3. Climate 18
   4.4. Cultural heritage 18
   4.5. Land, soil and groundwater 20
   4.6. Landscape and visual 21
   4.7. Noise and vibration 23
   4.8. Population 24
   4.9. Transport and access 25
   4.10. Water 27
   4.11. Glint and glare 28
   4.12. Other environmental considerations 28
   4.13. Cumulative effects 31
5. Next steps 33

1. Introduction

1.1. Background

1.1.1. Rosefield Energyfarm Limited (also known as the 'Applicant)' is a joint venture between EDF Renewables UK and Ireland and PS Renewables.

1.1.2. The Applicant is seeking to obtain development consent for the construction, operation (including maintenance) and decommissioning of Rosefield Solar Farm, located in Buckinghamshire.

1.1.3. To inform statutory consultation as part of the planning process, a Preliminary Environmental Information Report has been prepared to provide the information reasonably required for interested parties, including the public, to understand the likely significant effects of Rosefield Solar Farm on the surrounding environment and residents, as understood at this stage.

1.2. Environmental Impact Assessment

1.2.1. Environmental impact assessment is the process that identifies the key environmental effects resulting from the construction, operation and, where relevant, decommissioning of a proposed development. It suggests ways that these effects can be avoided, reduced or managed. Environmental impact assessment is a requirement of United Kingdom law for certain developments that have the potential to cause significant environmental effects.

1.3. Purpose of this Non-Technical Summary

1.3.1. The Preliminary Environmental Information Report outlines the environmental assessment work undertaken to date, the likely significant environmental effects identified to date, proposed 'embedded' mitigation[1] and 'additional' mitigation[2], and likely residual significant environmental effects based on the environmental baseline information currently available and the current design of Rosefield Solar Farm. The Preliminary Environmental Information Report is split into four volumes:

- **Volume 1**: Preliminary Environmental Information Report (main text);
- **Volume 2**: Supporting figures;
- **Volume 3**: Supporting reports; and

[1] Mitigation measures that are incorporated in the design of Rosefield Solar Farm.
[2] Mitigation measures to avoid, prevent, reduce or, if possible, offset any significant adverse effects that remain after embedded mitigation has been taken into consideration.

- **Volume 4**: Landscape Visualisations.

1.3.2. The Preliminary Environmental Information Report has been prepared to enable interested parties (including members of the public, local planning authorities and statutory bodies) to develop an informed view of the likely significant environmental effects of Rosefield Solar Farm and to help inform their consultation responses during this statutory consultation stage.

1.3.3. The design of Rosefield Solar Farm, as presented in the Preliminary Environmental Information Report, has been informed by the ongoing environmental assessment process and responses to consultation and engagement to date. **It does not represent the final design**. Further survey and design work is currently being undertaken which, along with feedback received from statutory consultation, will inform the further development of the design of Rosefield Solar Farm.

1.3.4. This document provides a non-technical summary of the environmental assessments presented in the Preliminary Environmental Information Report. Further details can be found in **Volumes 1** to **4** of the Preliminary Environmental Information Report. Below is an overview of where details on each environmental assessment can be found in **Table 1.1** below:

Table 1.1 – Location of each environmental assessment in the Preliminary Environmental Information Report

Chapter of Volume 1 of the Preliminary Environmental Information Report	Environmental assessment
Chapter 6	Air Quality
Chapter 7	Biodiversity
Chapter 8	Climate
Chapter 9	Cultural heritage
Chapter 10	Land, soil and groundwater
Chapter 11	Landscape and visual
Chapter 12	Noise and Vibration
Chapter 13	Population
Chapter 14	Transport and access
Chapter 15	Water
Chapter 16	Glint and glare
Chapter 17	Other environmental considerations
Chapter 18	Cumulative effects

2. Rosefield Solar Farm

2.1. Location

2.1.1. The location of Rosefield Solar Farm is shown on **Figure 1: Location plan** located in **Appendix A** of this Non-Technical Summary. Rosefield Solar Farm is located within the administrative boundary of Buckinghamshire Council. The settlements of Calvert, Middle Claydon, Botolph Claydon, East Claydon and Hogshaw lie within 1.5 kilometres of parts of the Site boundary.

2.2. Project description

2.2.1. Rosefield Solar Farm is a proposed solar photovoltaic electricity generating and battery storage facility with associated infrastructure, located in Buckinghamshire.

2.2.2. Rosefield Solar Farm comprises several parcels of land (Parcel 1, Parcel 1a, Parcel 2 and Parcel 3) and a cable search area (hereafter referred to as the 'Site') as outlined on **Figure 2: Site boundary** and **Figure 3: Zonal Masterplan** located in **Appendix A** of this Non-Technical Summary. The land parcels would be connected by a series of underground cables. Rosefield Solar Farm would establish a grid connection via underground cables to the National Grid East Claydon Substation, to transfer the electricity to the national electricity network.

2.2.3. Rosefield Solar Farm will comprise the following elements:

- Solar Photovoltatic (PV) development consisting of ground mounted Solar PV generating station and a Balance of Solar System (BoSS).
- Collector Compounds;
- Battery Energy Storage System (BESS) compound(s);
- A project substation ('Rosefield Substation') compound
- Site-wide operational monitoring and security equipment;
- 400kV Grid Connection Corridor to connect the Rosefield Substation and National Grid East Claydon Substation;
- Cabling to connect the Solar PV modules and the BESS to Collector Compounds, the Collector Compounds to the Rosefield Substation, and the Rosefield Substation to the National Grid East Claydon Substation;
- Ancillary infrastructure works;
- Green Infrastructure, recreation and amenity works; and
- Highways Infrastructure improvements and safety works.

2.2.4. The export capacity of Rosefield Solar Farm would exceed 50 megawatts. Therefore, Rosefield Solar Farm is classified as a Nationally Significant

Infrastructure Project and will require a Development Consent Order under the Planning Act 2008[3].

2.3. Existing land use

2.3.1. The Site comprises approximately 744 hectares of land. The Site boundary is the anticipated maximum area of land that would be required to facilitate the construction, operation (including maintenance) and decommissioning of Rosefield Solar Farm. The land within the Site boundary predominately consists of agricultural fields and pastureland interspersed with hedgerows, ditches, woodland blocks and farm access tracks.

2.4. Environmental designations

2.4.1. The Site itself does not hold any natural or historic designations, but there are numerous designations within its vicinity, as illustrated in **Figure 4: Environmental Features Plan** located in **Appendix A** of this Non-Technical Summary.

Ecology and biodiversity

2.4.2. There are no international statutory designations within 10 kilometres of the Site boundary.

2.4.3. There are three statutory nationally designated sites within 2 kilometres of the Site boundary:

- Sheephouse Wood Site of Special Scientific Interest (adjacent to Parcel 1 and Parcel 1a);
- Finemere Wood Site of Special Scientific Interest (adjacent to Parcel 2); and
- Grendon and Doddershall Woods Site of Special Scientific Interest (approximately 1.36 kilometres south-west of Parcel 1a).

2.4.4. There are 22 non-statutory designated sites within 2 kilometres of the Site boundary, namely 14 Local Wildlife Sites, five Biological Notification Sites, two Wildlife Trust Reserves and one Biodiversity Opportunity Area. Those that are adjacent to the Site boundary comprise:

- Bernwood Biodiversity Opportunity Area (overlaps with Parcel 1, 1a and 2);
- Shrub Woods Local Wildlife Site (adjacent to Parcel 1);
- Decoypond Wood Local Wildlife Site (adjacent to Parcel 1);

[3] Planning Act 2008. Available online: https://www.legislation.gov.uk/ukpga/2008/29/section/14

- Romer Wood Local Wildlife Site (adjacent to Parcel 1a);
- Runts Wood Local Wildlife Site (adjacent to Parcel 2);
- Finemere Wildlife Trust Reserve (adjacent to Parcel 2);
- Home Wood, Middle Claydon Local Wildlife Site (adjacent to the search area for the underground cable route);
- Balmore Wood Local Wildlife Site (adjacent to the search area for the underground cable route); and
- Greatsea Wood Local Wildlife Site (adjacent to the search area for the underground cable route).

2.4.5. There are 52 areas of ancient woodland within 2 kilometres of the Site boundary, of which, 33 are areas of ancient semi-natural woodland and 19 are areas of replanted ancient woodland. The closest areas of ancient woodland are directly adjacent to the Site boundary and are shown on **Figure 4: Environmental Features Plan** located in **Appendix A** of this Non-Technical Summary. These consist of:

- Shrubs Woods (adjacent to Parcel 1 and the cable route search area);
- Sheephouse Wood (adjacent to Parcel 1, Parcel 1a, and the cable route search area);
- Romer Wood (adjacent to Parcel 1a and the cable route search area);
- Runts Wood (adjacent to Parcel 2 and the cable route search area);
- Finemere Wood (adjacent to Parcel 2 and the cable route search area);
- Home Wood (adjacent to cable route search area);
- Greatsea Wood (adjacent to cable route search area);
- Decoypond Wood (adjacent to Parcel 1); and
- Balmore Wood (adjacent to cable route search area).

Landscape

2.4.6. The southern area of Parcel 2 is situated in a local designation of Quainton-Wing Hills Area of Attractive Landscape with Quainton Hill located approximately 2 kilometres southeast of Parcel 2. The Chilterns National Landscape is located approximately 18 kilometres from the Site boundary.

2.4.7. Rosefield Solar Farm is located within National Character Area 108 Upper Clay Vales.

Cultural Heritage

2.4.8. There are no designated cultural heritage assets located within the Site boundary.

2.4.9. The Site is situated adjacent to two Conservation Areas, Botolph Claydon and Middle Claydon. Botolph Claydon Conservation Area lies north of Parcel 2 and Middle Claydon lies to the north of Parcel 1.

2.4.10. There are six Scheduled Monuments within 5 kilometres of the Site boundary. Five of these are medieval in date and form a Preceptory of the Knights Hospitallers, two deserted villages, a standing cross, and a moated site. One is an Iron Age slight univallate hillfort.

2.4.11. The following cultural heritage assets are also present within 5 kilometres of the Site boundary:

- Three Registered Parks and Gardens (two Grade I and one Grade II);
- 14 Conservation Areas (including Botolph Claydon and Middle Claydon Conservation Areas);
- Eight Grade I Listed Buildings;
- 26 Grade II* Listed Buildings; and
- 404 Grade II Listed Buildings.

Geology

2.4.12. Bedrock geology across the Site comprises the following mudstone layers:

- West Walton Formation;
- Weymouth Mudstone Member;
- Stewartby Member; and
- Peterborough Member.

2.4.13. The superficial geological units within the Site include alluvium, till, glaciofluvial deposits and glacial deposits. Made ground is potentially present in localised areas associated with farm buildings or tracks, and along the route of the historical railway.

2.4.14. The Site is underlain by superficial geological units that are classified as secondary A aquifer and a secondary undifferentiated aquifer.

Water resources

2.4.15. There are no Main Rivers located within the Site. The closest Main River, River Ray, is located approximately 200 metres south of Parcel 2.

2.4.16. Several minor ordinary watercourses and drainage ditches are located in the western section of Parcel 1, directly north of Parcel 1a and directly east of Parcel 3 (Claydon Brook).

2.4.17. As shown on **Figure 4: Environmental Features Plan** located in **Appendix A** of this Non-Technical Summary, the Site is predominately

located within Flood Zone 1. There is a small section on the eastern boundary of fields within Parcel 3, adjacent to the Claydon Brook, that form part of Flood Zones 2 and 3.

2.4.18. The Site is not located within a Source Protection Zone; however, it is located within a Drinking Water Zone for surface water.

2.5. Need for Rosefield Solar Farm

2.5.1. Rosefield Solar Farm would help the United Kingdom build a low-carbon energy system and make an important contribution to meeting the United Kingdom Government's target of net zero carbon emissions and a secure, low carbon UK energy supply

2.5.2. Low carbon solar generation is essential to enabling the decarbonisation of the United Kingdom's energy system. This is in line with the Overarching National Policy Statement for Energy (EN-1)[4], published in November 2023, which states that "*a secure, reliable, affordable, net zero consistent system in 2050 is likely to be composed predominantly of wind and solar*". It also states that low-carbon energy infrastructure, including solar and Battery Energy Storage Systems, is a "critical national priority."

2.6. Alternatives considered

Alternative sites

2.6.1. The proposed Site has been selected following an in-depth site selection process in accordance with the key site selection factors outlined in the National Policy Statement for Renewable Energy Infrastructure (EN-3)[5].

2.6.2. The Site is of a large enough scale to deliver sufficient wattage (greater than 50 megawatts), to help deliver as much solar energy as possible to meet United Kingdom Government targets. The Applicant did not consider sites that could only deliver smaller scale projects.

2.6.3. The site selection process considered a number of factors including:

- Network connection – the site selection focused on the area around the National Grid East Claydon Substation where there was an available connection with preference given to sites in close proximity to the point of connection.

[4] Overarching National Policy Statement for Energy (EN-1) (2023). Available online: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1

[5] National Policy Statement for Renewable Energy Infrastructure (EN-3) (2023). Available online: https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3

- Irradiance and site topography – preference was given to sites with a south facing aspect and flatter topography.
- Proximity of site to dwellings – the site selection sought to avoid sites in close proximity to residential dwellings or where it would not be possible to appropriately mitigate visual amenity and glint and glare.
- Agricultural land classification and land type – the site selection sought to minimise the impact on best and most versatile agricultural land.
- Accessibility – the site selection considered the suitability of the access routes to the proposed sites, both during construction and operation.

2.6.4. Other considerations include environmental and spatial constraints (for example avoiding direct impacts on designated ecological and geological sites, historic designations and nationally designated landscapes), site size and land assembly (for example identifying sufficient adjoining areas of land for Rosefield Solar Farm to be economically viable), and land availability (for example identifying willing landowners with large scale land holdings).

Alternative technologies

2.6.5. The Site is considered challenging for onshore wind energy generation due to the topography of the Site which would likely give rise to significant landscape and visual effects, alongside the proximity to residential dwellings which may be subject to adverse effects associated with shadow flicker and wind turbine noise. Wind farms also require more land to produce the same capacity as solar development. In addition, planning policy at the time made it exceptionally difficult to achieve planning consent for onshore wind, almost amounting to a moratorium by the Government on its development. Whilst policy had begun to change shortly after the project commenced, it had not yet reached a sufficiently supportive position for this type of energy infrastructure to be proposed.

2.6.6. The Site was not considered suitable for hydrogen technology due to the construction and commercial viability for this type of energy generation in comparison to solar energy generation. For example, there would need to be a significant source of water and a nearby off-taker or a hydrogen pipeline or road network that is capable of accommodating frequent heavy-good vehicle movements for the lifetime of a hydrogen development to deliver the hydrogen to end users.

2.6.7. It is therefore considered that solar technology is the best renewable energy generating solution for the Site, taking into account its suitable topography, relatively high solar irradiance, and other factors set out in the Preliminary Environmental Information Report.

Alternative layouts

2.6.8. The current design and layout of Rosefield Solar Farm (shown on **Figure 3: Zonal Masterplan** located in **Appendix A** of this Non-Technical Summary) has resulted from an iterative process informed by ongoing environmental assessment and taking into consideration the design principles, non-statutory consultation feedback and stakeholder engagement. The layout will continue to be developed with regard given to statutory consultation responses and further environmental assessments and stakeholder engagement.

2.6.9. Modifications to the design and layout of Rosefield Solar Farm up to this point include the removal of solar photovoltaic development and associated infrastructure from certain areas and refinement of the locations of proposed Battery Energy Storage System components and substations and the cable route options in response to the findings of environmental assessments. See **Section 2.8** of this Non-Technical Summary for more details.

2.7. Construction of Rosefield Solar Farm

2.7.1. Subject to obtaining development consent, the construction is assumed to commence no earlier than Spring of 2028 and is anticipated to take up to 30 months. The Environmental Statement will provide further details of the proposed construction activities and their assumed duration, along with an assumed programme of each phase of works.

2.7.2. There is one construction access route to the Site being considered as a proposed solution. This access route makes use of the A41 to Claydon Road via Fiddlers Field/Snake Lane. The requirement for highways improvements will be determined following completion of further assessments, but possible highways improvement locations have been identified.

2.7.3. Construction compounds are expected to be established in each Parcel for the storage of materials, plant and equipment. Any construction areas would be closed to the public throughout the construction phase to ensure public safety.

2.8. Environmental constraints and opportunities

2.8.1. **Table 2.1** below outlines the main ways in which the design has responded to environmental constraints and opportunities that have been identified up to this point. Further examples are presented in **Volume 1** of the Preliminary Environmental Information Report.

Table 2.1 – Examples of embedded (primary) environmental mitigation measures

Embedded (primary) environmental mitigation measure
A minimum 20 metres offset from High Speed 2 woodland planting (adjacent to Parcel 1) to the fence line of the Solar photovoltaic modules.
A minimum 30 metres offset from all fence lines within Rosefield Solar Farm to statutorily and locally designated wildlife sites (for example Sheephouse Wood Site of Special Scientific Interest).
A minimum 30 metres offset from all fence lines within Rosefield Solar Farm to ancient woodlands (for example Runts Wood).
A minimum 20 metres offset from all fence lines within Rosefield Solar Farm to existing woodlands.
A minimum 10 metres offset from all fence lines within Rosefield Solar Farm to existing hedgerows.
Minimum offset of at least 10 m either side of Main Rivers, and 6 m from ditches and ordinary watercourses[6], to all fence lines within Rosefield Solar Farm.
A minimum 50 metres offset from all fence lines within Rosefield Solar Farm to existing main [redacted]
A minimum 55 metres offset from all fence lines within Rosefield Solar Farm to Bernwood Jubilee Way.
A minimum 20 metres offset from all fence lines within Rosefield Solar Farm to Midshires Way.
A minimum 10 metres offset from all fence lines within Rosefield Solar Farm to all other existing and proposed public rights of way except where crossings are necessary.
A minimum 250 metres offset from the fence line around the Inverter Transformer Station, Battery Energy Storage System, Rosefield Substation and Collector Compounds to residential properties, determined on a case by case basis.
Offsets from the fence line around the Solar photovoltaic development to residential properties determined on a case by case basis.
Removal of Know Hill (Field B17) and half of Field B9 from Solar photovoltaic development.

[6] An ordinary watercourse is a watercourse that is not part of a Main river, and includes rivers, streams, ditches, drains, cuts, culverts, dikes, sluices, sewers, and passages through which water flows.

Embedded (primary) environmental mitigation measure
Removal of fields in the southern part of Parcel 2 (Fields D27 and D30 to D37) from Solar photovoltaic development.
Removal of fields in Parcel 1a (Fields C1, C2 and C3) from Solar photovoltaic development.
Removal of fields south-west of Botolph Claydon (Fields D1, D2, D3 North, and D5) from Solar photovoltaic development.
Siting of Satellite Collector Compounds, Main Collector Compounds, Rosefield Substation and Battery Energy Storage System will be outside of areas at higher risk of flooding (Flood Zone 2 and Flood Zone 3).
No Solar photovoltaic development will occur within the centre/north of the Site (between Parcels 1, 1a and 2).
Any vegetation cleared to facilitate the construction of Rosefield Solar Farm will be compensated during operation by a planting scheme that equals or exceeds the current levels of vegetation.
Best and Most Versatile agricultural land will be avoided as far as possible.

3. Approach to the Environmental Impact Assessment

3.1. Environmental Impact Assessment Process

3.1.1. Environmental Impact Assessment is a systematic process that examines the likely significant effects (beneficial or adverse) on the environment resulting from the construction, operation (including maintenance) and decommissioning of a proposed development. The process is shown on **Plate 5.1: Main stages of the Environmental Impact Assessment process**. The Preliminary Environmental Information Report is the third stage in this plate.

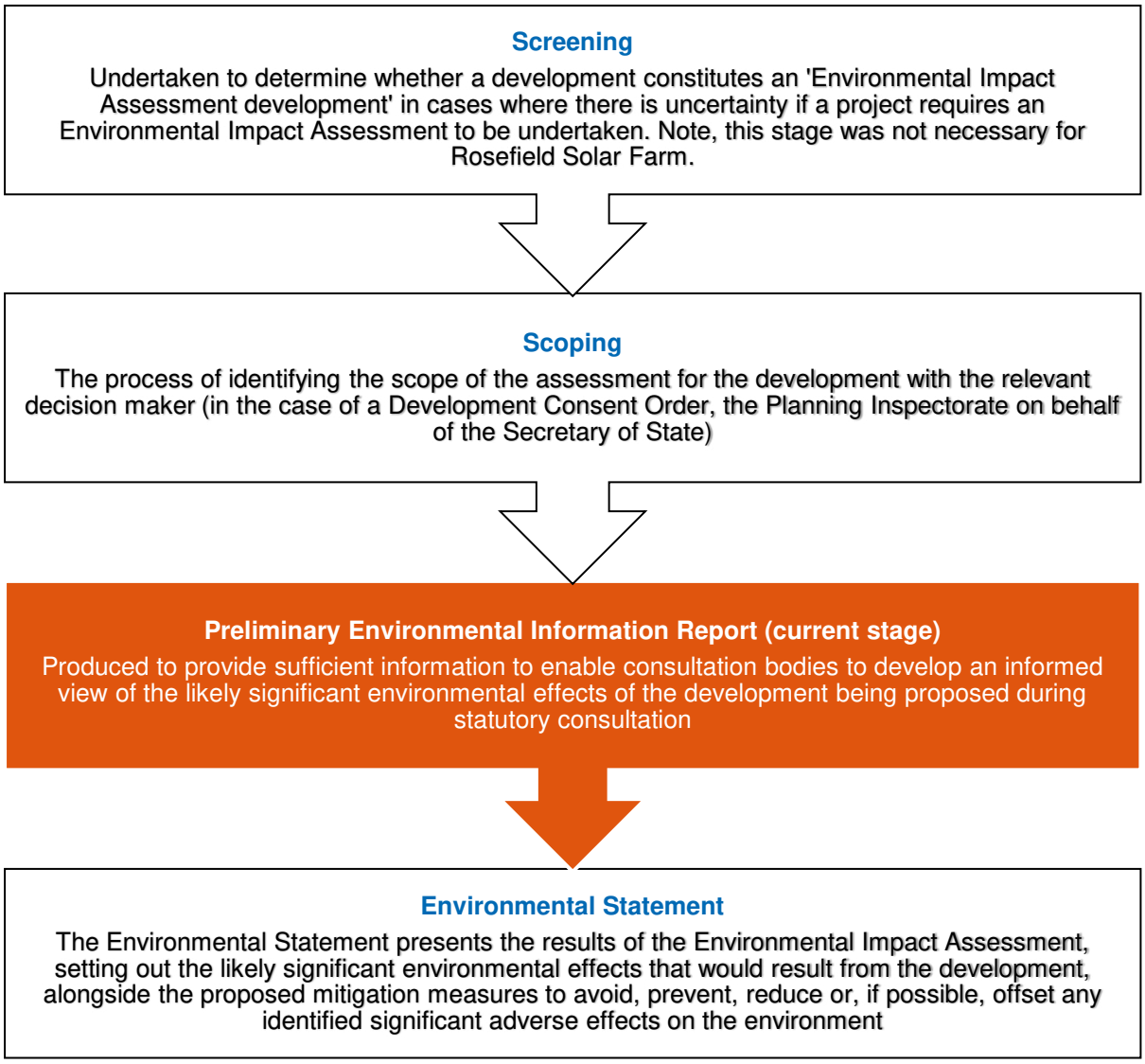


Plate 5.1 – Main stages of the Environmental Impact Assessment process

3.1.2. An Environmental Statement will be submitted in support of the application for this Development Consent Order. An Environmental Statement is used

to report to decision makers, consultees and stakeholders on the likely significant environmental effects of a development and helps the decision maker (in the case of a Development Consent Order, the Secretary of State) determine the application for consent.

3.1.3. In order to maintain flexibility in the design, maximum limits have been defined to ensure a reasonable worse-case has been assessed. This may vary for each environmental factor, further detail is included in **Volume 1** of the **Preliminary Environmental Information Assessment**. As the design of Rosefield Solar Farm evolves, more information will become available and key elements of the design will be refined.

4. Assessment findings

4.1. Air Quality

Construction and decommissioning phase

4.1.1. Dust and emissions released via construction works and construction traffic movements have the potential to adversely affect air quality and impact on nearby sensitive human and ecological receptors (for example Sheephouse Wood Site of Special Scientific Interest). The same applies during the decommissioning phase, but to a lesser extent.

4.1.2. Site-specific dust mitigation measures would be proposed based on the results of a pre-mitigation dust impacts assessment to be undertaken. Mitigation measures, for example relating to construction site management and operation of machinery, will be documented in an Outline Construction Environmental Management Plan and an Outline Decommissioning Environmental Management Plan. Measures to manage the impact of construction traffic emissions, such as minimising the use of sensitive routes by heavy goods vehicles, are expected to be documented in an Outline Construction Traffic Management Plan. These outline plans will be submitted in support of the Development Consent Order application.

4.1.3. With mitigation measures in place, the effects of dust and emissions during construction and decommissioning are predicted to be **not significant**.

Operation (including maintenance) phase

4.1.4. No site activities that generate significant emissions are anticipated during the operational phase and there would be minimal vehicle movements (for example maintenance vehicles) during operation. Therefore, impacts of Rosefield Solar Farm on air quality during the operational (including maintenance) phase are not considered further in the preliminary assessment.

4.2. Biodiversity

Statutory sites, non-statutory designated sites and ancient woodland

4.2.1. There are three nationally protected statutory designated nature conservation sites within 2 kilometres of the Site boundary, of which Sheephouse Wood Site of Special Scientific Interest and Finemere Wood Site of Special Scientific Interest are located adjacent to the Site boundary. Initial discussions with Natural England have indicated that the boundary of the Sites of Special Scientific Interest will be extended. It is not yet known whether this extension will include areas within the Site boundary.

4.2.2. One non-statutory designated site is located within the Site boundary, this being Bernwood Biodiversity Opportunity Area, which overlaps with Parcel 1, 1a and 2. There are 22 non-statutory designated sites within 2 kilometres of the Site boundary, namely 14 Local Wildlife Sites, five Biological Notification Sites, two Wildlife Trust Reserves and one Biodiversity Opportunity Area (refer to **paragraph 2.4.4** above for further details).

4.2.3. No areas of ancient woodland are located within the Site boundary; however, 21 areas of ancient woodland are located directly adjacent to the Site boundary (refer to **paragraph 2.4.5** above for further details). There are a further 32 areas of ancient woodland within 2 kilometres of the Site boundary.

4.2.4. Construction, operational and decommissioning activities are not anticipated to have a direct impact on any designated sites, given embedded design principles will include a minimum standoff distance from Solar photovoltaic modules and associated infrastructure from these sites. The implementation of standard environmental protection measures during construction and decommissioning will be adopted and these measures will be documented within the Outline Construction Environmental Management Plan and Outline Decommissioning Environmental Management Plan which will be submitted in support of the Development Consent Order application. Security fences will ensure provision of buffers during construction and commissioning works. Limited maintenance work during the operational (including maintenance) phase of Rosefield Solar Farm is anticipated. The environmental mitigation areas that buffer these sites would be appropriately managed during the operational (including maintenance) phase, detailed within the Outline Landscape and Ecological Management Plan and Outline Operational Environmental Management Plan which will be submitted in support of the Development Consent Order application.

4.2.5. Overall, given the embedded and additional mitigation measures relating to statutory sites, non-statutory designated sites and ancient woodland, residual effects are considered to be **not significant**.

Habitats

4.2.6. The Site predominantly consists of agricultural fields (mostly arable with some grassland) interspersed with hedgerows, small woodland blocks, ponds and farm access tracks. Several minor watercourses run adjacent to the Site boundary, including the Claydon Brook and tributaries, alongside small field drains and ditches that run parallel to numerous field boundaries.

4.2.7. The majority of these habitats are expected to be retained and managed to enhance biodiversity through the embedded design principles which will include a minimum standoff distance from Solar photovoltaic modules and associated infrastructure from these habitats. Environmental mitigation

areas that have been incorporated within the Rosefield Solar Farm design (including the creation of species-rich grassland, arable margins, scrub and tree planting and restoration of defunct ponds) would be appropriately managed during the operational (including maintenance) phase, detailed within the Outline Landscape and Ecological Management Plan and Outline Operational Environmental Management Plan which will be submitted in support of the Development Consent Order application.

4.2.8. Where Solar photovoltaic modules are proposed to be placed on areas of existing grassland, this will result in modification of the habitat due to shading and other effects. The environmental mitigation measures that will be incorporated include seeding the areas beneath and adjacent to Solar photovoltaic modules with an appropriate species-rich grassland seed mix to improve grassland habitat. Where Solar photovoltaic modules are proposed to be located on areas of cereal and non-cereal crops, the environmental mitigation measures that will be incorporated include seeding these with an appropriate herbal ley seed mix, resulting in cereal and non-cereal crop habitat being replaced with habitat that is of higher biodiversity value.

4.2.9. Overall, given the embedded and additional mitigation measures relating to habitats, residual effects during the construction and operational (including maintenance) phase are considered to be **not significant**. However, given the proposed embedded mitigation measures to improve the ecological value of fields within the Site boundary, the biodiversity improvement gained during the operational (including maintenance) phase may be lost if fields are returned to intensive agricultural use at decommissioning. Therefore, the likely effects of the decommissioning phase on habitats may potentially be greater. Appropriate measures will be put in place to minimise direct loss of habitat and disturbance during decommissioning.

Species

4.2.10. Species supported by the Site and surroundings include protected or otherwise notable invertebrate species (including black hairstreak, white admiral, white-letter hairstreak and brown hairstreak), amphibians including great crested newts, reptiles, wintering and nesting birds, bats (comprising common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, noctule, Leisler's, serotine, brown long-eared, barbastelle, Bechstein's, Daubenton's, Whiskered, Brandt's and Natterer's), otter, badger, brown hare, European hedgehog and other small mammals.

4.2.11. Construction and decommissioning of Rosefield Solar Farm could cause disturbance and lead to a short-term loss of foraging and/or breeding habitat for these species. Measures to safe-guard species during construction/decommissioning include retention of habitats suitable to support species where possible (through minimum standoff distance from Solar photovoltaic modules and associated infrastructure), sensitively designed lighting proposals, and fencing design that ensures wildlife can

still move through the landscape. Pre-construction surveys and the need for Species Protection Plans will be documented within the Outline Construction Environmental Management Plan and Outline Decommissioning Environmental Management Plan which will be submitted in support of the Development Consent Order application.

4.2.12. The environmental mitigation measures that will be incorporated into the design of Rosefield Solar Farm (including provision of species-rich grassland, scrub, trees, hedgerows, arable field margins and restoration of ponds) would be appropriately managed during the operational (including maintenance) phase, as detailed within an Outline Construction Environmental Management Plan/Outline Landscape and Ecological Management Plan/Outline Operational Environmental Management Plan. This will improve habitat suitable to support species across the Site. Along with retaining existing habitats wherever possible, the location of mitigation areas has been chosen to ensure the woodland and hedgerow connections between the existing Sites of Special Scientific Interest and ancient woodland adjacent to the Site would be enhanced. By creating species-rich grassland and arable margins along with scrub, hedgerow and tree planting, and restoration of ponds, this will create a coherent ecological network that will link the Site to the wider landscape, supporting the movement of local wildlife.

4.2.13. Overall, given the embedded and additional mitigation measures relating to species (excluding commuting and foraging bats), residual effects during the construction, operational (including maintenance) and decommissioning phases are considered to be **not significant**.

4.2.14. Recent evidence has indicated that some species of bat are (to an extent) displaced by Solar PV modules, although the exact mechanism causing the displacement, and over what distance the displacement effect occurs, is not yet known. In addition, disturbance as a result of operational noise from the Battery Energy Storage System is considered likely. This would constitute an effect for the duration of the operational (including maintenance) phase. Notwithstanding the embedded and additional mitigation measures, overall, the residual effect on commuting and foraging bats could result in a **direct**, **long-term, permanent** (for the duration of the operational (including maintenance) phase), **adverse effect** which would potentially result in a **significant** effect. These effects are expected to be reduced by the proposed mitigation; however, a full assessment to determine the residual impact will be presented within the Environmental Statement.

4.2.15. Opportunities for enhancement, such as providing bat and bird boxes on trees, creation of amphibian and reptile hibernacula and installation of artificial otter holts, would be considered during the detailed design of Rosefield Solar Farm.

4.2.16. Habitat creation and enhancement measures will be assessed in a Biodiversity Net Gain Assessment that will be submitted in support of the Development Consent Order application.

4.2.17. Further consultation with appropriate stakeholders will be undertaken to determine whether the data gathered to date, as well as proposed surveys, is sufficient to provide a full biodiversity assessment to inform the Development Consent Order application. Further consultation will also ensure any ecological enhancements consider cumulative effects of other existing development and/or approved development.

4.3. Climate

4.3.1. Rosefield Solar Farm has the potential to affect the global climate through the addition or avoidance of greenhouse gas emissions. Greenhouse gas emissions could occur directly from construction, operation and decommissioning activities (for example fuel consumption), but emissions occurring outside of the Site boundary must also be considered, such as those resulting from the extraction, manufacture and transportation of materials to the Site during construction.

4.3.2. The Outline Construction Environmental Management Plan will document measures to reduce greenhouse gas emissions in the construction phase. Such measures could include decreasing fuel use by maximising energy efficiency, promoting sustainable fuels and recycled materials, and using locally sourced materials as much as is practicable.

4.3.3. During the operational (including maintenance) phase, significant greenhouse gas savings are anticipated due to the displacement of fossil-fuel derived electricity within the National Grid. Proposed planting could increase the carbon sequestration potential of the land.

4.3.4. Overall, Rosefield Solar Farm is anticipated to have a **significant beneficial** effect on the climate.

4.4. Cultural heritage

Heritage assets within the Site

4.4.1. A desk-based assessment, site visit and geophysical survey have been undertaken. The development layout is being finalised and assessments are ongoing (such as geophysical survey and other archaeological evaluations), meaning uncertainty remains about the impacts on some heritage assets. At the current design stage, and without consideration of additional mitigation, 14 designated heritage assets and 198 non-designated heritage assets of up to medium importance could potentially be at risk of significant effects.

4.4.2. Physical impacts to heritage assets could include damage to below- and/or above-ground archaeological remains and listed buildings during

the construction or operational (including maintenance) phases. The Site layout has been designed to avoid directly impacting on heritage assets as much as is practicable.

4.4.3. Mitigation measures to protect the physical remains of in-situ designated heritage assets will be secured within the Outline Construction, Operational and Decommissioning Environmental Management Plans which will be submitted in support of the Development Consent Order application and could include the installation and maintenance of fencing around assets during construction works. Toolbox talks to inform site contractors of the procedure to follow in case of archaeological remains being exposed would also be produced.

4.4.4. With mitigation in place, effects are anticipated to be **not significant** regarding physical impacts on heritage assets both within and outside of the Site boundary.

Changes to the setting of heritage assets

4.4.5. Impacts on the setting of a heritage asset could include temporary loss of tranquillity during construction or partial loss of surrounding undeveloped land during operation.

4.4.6. No development would take place in sections of certain fields to reduce impacts on the settings of certain heritage assets within Middle Claydon and Botolph Claydon Conservation Areas. Some adverse residual setting effects would occur due to increased noise, dust and/or lighting associated with construction and decommissioning activities. However, as these setting effects would be temporary and fully reversible, they are considered to be **not significant**.

4.4.7. Potentially significant effects resulting from changes in their setting during operation may be experienced by;

- Claydon House (NHLE 1288461)
- Claydon Registered Park and Garden (NHLE 1000597)
- Finemerehill House (NHLE 1117815)
- Pond Farmhouse (NHLE 1214849)
- Dry Leys Farmhouse (NHLE 1319271)
- Catherine Farm (non-designated)
- Middle Claydon Conservation Area
- Botolph Claydon Conservation Area

4.4.8. Opportunities for enhancement will be explored as the detailed design is developed, such as the installation of information boards and new permissive paths to improve public access to heritage assets.

4.5. Land, soil and groundwater

Contamination and groundwater

4.5.1. During construction and decommissioning, there is a risk of soil contamination from spills when refuelling or operating equipment. A Preliminary Risk Assessment did not identify any significant sensitive receptors relating to land contamination.

4.5.2. Construction and decommissioning activities could lead to minor damage to field drains, which may affect the localised drainage of the agricultural land and the groundwater quality of the underlying aquifer. Spillages or leaks of fuels, oils, and chemicals and silt run-off, for example from construction activities or from maintenance works during operation, could potentially pollute the underlying aquifer. The likelihood of significant effects is lower during operation compared to construction and decommissioning, as fewer activities are involved. The presence of hard surfaces, for example for Rosefield Substation, could affect groundwater infiltration rates.

4.5.3. The Outline Construction, Operational and Decommissioning Environmental Management Plans would include procedures to mitigate against land contamination and effects to groundwater, including emergency procedures to manage accidental spillages and leaks.

4.5.4. With mitigation, the effect on land contamination and on groundwater is anticipated to be **not significant** for all phases of Rosefield Solar Farm.

Soil quality and Best and Most Versatile land

4.5.5. Construction activities could cause compaction and deterioration of the soil. However, handling and moving of soil would be limited and avoided where practical. During the operational phase, there will a reduction in soil handing due to the reduction in farming practices (ploughing, harvesting etc.). During decommissioning, it is assumed that below ground cabling would be left in situ, therefore limiting the disturbance and impact to soil quality.

4.5.6. Based on the agricultural land classification surveys undertaken to date, approximately 0.5% (3.0 hectares) of this agricultural land is classified as Grade 2 Best and Most Versatile land, 1.2% (7.0 hectares) is classified as Grade 3a Best and Most Versatile land, and 97% (576.4 hectares) is classified as Grade 3b non- Best and Most Versatile land. The site selection and design of Rosefield Solar Farm has sought to minimise the use of best and most valuable land. Other embedded mitigation includes optimising existing tracks, crossings, and gaps in the hedgerows for access tracks and cable routes wherever practicable and running cabling alongside access tracks as much as possible to avoid wider excavations.

4.5.7. An Outline Soil Management Plan will be submitted in support of the Development Consent Order application to document measures to manage any potential impacts to the soil (and agricultural land), which is expected to include guidance on restoring the land to its pre-construction condition at the end of the lifetime of Rosefield Solar Farm.

4.5.8. Soil health could be enhanced during operation through the implementation of a Soil Management Plan and the proposed permanent cover of grassland and wildflowers, which would help reduce soil erosion. Such measures will be detailed in the Environmental Statement.

4.5.9. With mitigation, the effect on soils and agricultural land could have a **potentially significant** adverse effects on areas of Best and Most Versatile Grade 2 and Grade 3a agricultural land during the construction and operation (including maintenance) phases and **not significant** during decommissioning.

4.5.10. With mitigation, the effect on soils and agricultural land is anticipated to be **not significant** for areas of Grade 3b agricultural land during the construction and operation (including maintenance) phases and **not significant** during decommissioning.

4.5.11. A Minerals Safeguarding Assessment[7] will be undertaken to inform the design of Rosefield Solar Farm and will form part of the Planning Statement submitted in support of the Development Consent Order application.

4.6. Landscape and visual

Landscape character

4.6.1. The landscape is characterised by low lying vales and clay plateaus punctuated by low hills and ridges. This varied landform, together with a relatively high percentage of woodland cover, leads to the landscape being experienced very differently depending on its local attributes. At times intimate and enclosed by landform and mature woodland, but more often experienced in longer distance views of rising land from within the lower lying fields, or more open panoramic views from the hills and elevated ridges.

4.6.2. No part of the Site or its immediately surrounding context falls within a nationally designated landscape, albeit the southern extent of Parcel 2 is in the locally designated Area of Attractive Landscape.

[7]An assessment of land to identify the potential future extraction of minerals and whether this creates a conflict with a proposed development (the minerals could not be extracted due to construction of the development).

4.6.3. Embedded mitigation of landscape and visual effects includes retention of existing trees and hedgerows as much as is practicable (**Figure 4** located in **Appendix A**), offsets of solar infrastructure from residential properties and public rights of way, new planting, use of underground cables, and use of existing access tracks wherever practical.

4.6.4. With embedded mitigation, **significant adverse** landscape character effects are anticipated on Landscape Character Areas 'Hogshaw Claylands,' 'Westcott Claylands,' 'Claydon Bowl', 'Finemere Hill' and 'Quainton Hill' within 3 kilometres of Rosefield Solar Farm during the operational (including maintenance) phase.

Visual receptors

4.6.5. Visual receptors include local residents, users of public rights of way and users of the local road network. The varied landform and landcover means that there can be long-distance and panoramic views as well as those foreshortened by topography and mature woodland.

4.6.6. A comprehensive landscape scheme (the Outline Landscape and Ecological Management Plan) will be developed in accordance with the design principles to integrate Rosefield Solar Farm into the landscape and to mitigate visual effects as far as practicable. The Outline Landscape and Ecological Management Plan will be submitted in support of the Development Consent Order application. The landscape scheme would be complementary to any biodiversity and other environmental objectives.

4.6.7. Likely **significant adverse** visual effects on local settlements are anticipated to be limited to Steeple Claydon, Botolph Claydon and Granborough.

4.6.8. After mitigation, visual effects during the construction and decommissioning phases are anticipated to be **not significant** for all key road routes. However, **significant adverse** visual effects are anticipated on Claydon Road during year 1 of operation, reducing to **not significant** by year 10. Four walking recreational routes, including the Bernwood Jubilee Way and North Buckinghamshire Way/Midshires Way, all of which pass within the Site, would experience **significant adverse** visual effects during the construction, operational (including maintenance) and decommissioning phases. Other local footpaths potentially experiencing **significant adverse** visual effects during the operational (including maintenance) phase are those extending south from Steeple Claydon to within Parcel 1, those extending to the south of Botolph Claydon to within Parcel 2, those extending east from East Claydon to within Parcel 3 and then proceeding towards Granborough and those on the elevated land of Quainton Hill and Conduit Hill.

4.6.9. Likely **significant adverse** visual effects are also anticipated to be experienced by visitors from within the grounds of Hogshaw Farm and Wildlife Park and Claydon House.

4.6.10. A residential visual amenity assessment will be undertaken and submitted alongside the Environmental Statement to assess residential properties identified as potentially experiencing significant effects on visual amenity.

4.7. Noise and vibration

Construction and decommissioning phases

4.7.1. At this preliminary assessment stage, detailed construction and decommissioning methodologies and plant lists have not been defined; therefore, a qualitative assessment has been undertaken based on previous project experience. The qualitative construction assessment has assumed the use of standard construction techniques appropriate for the type of works being undertaken. The assessment has shown that the increase in daytime noise and vibration due to construction and decommissioning phase activities (including construction traffic) could cause potential disturbance at nearby residential properties.

4.7.2. During the construction and decommissioning phases, Best Practicable Means as defined by the Control of Pollution Act 1974 would be implemented to reduce noise and vibration impacts on residential properties located near the works. This, and other control measures, would be documented in the Outline Construction Environmental Management Plan which will be submitted in support of the Development Consent Order application.

4.7.3. Following the implementation of a series of mitigation measures, the residual effect at residential receptors is anticipated to be **not significant** during construction and decommissioning phases.

Operational (including maintenance) phase

4.7.4. Baseline noise surveys have been undertaken to establish the existing acoustic environment experienced by sensitive receptors in the vicinity of the Site. The resultant dataset has been used to derive the noise criteria for the operational (including maintenance) phase.

4.7.5. Initial noise prediction modelling has been undertaken to establish whether there is potential for the proposed equipment to give rise to disturbance at noise sensitive receptors in the surrounding area. The results of the noise modelling have informed the design of Rosefield Solar Farm.

4.7.6. It is expected that operating scenarios will be refined as part of the ongoing design. This design development may include consideration of alternative equipment specifications and alternative locations of noise emitting equipment within the Site boundary, in accordance with the design principles and within the areas outlined in **Figure 3: Zonal Masterplan** located in **Appendix A**. Prospective design solutions will not be progressed if the associated residual noise levels post-mitigation result in significant adverse effects.

4.7.7. From the modelling that has been undertaken, it is considered that the noise levels generated by proposed equipment can be designed and/or positioned to comply with acoustic criteria at all surrounding sensitive receptors. As part of the Environmental Statement, the operational (including maintenance) phase noise assessment will be refined which will identify any requirements for additional mitigation measures, such as noise barriers or enclosures.

4.7.8. Following the implementation of a series of mitigation measures, the residual effects of noise generated by operational equipment at nearby residential receptors is anticipated to be **not significant**.

4.8. Population

4.8.1. The population assessment has considered the following:

- Private property and housing – no properties are at risk of demolition to accommodate Rosefield Solar Farm and none of the Site is allocated for residential development. Therefore, no impacts to property or housing are anticipated.
- Community land and assets – Rosefield Solar Farm largely covers agricultural land, and no community assets are located within the Site boundary. Therefore, no impacts to community land and assets are anticipated.
- Agricultural land holdings, development land and business – there are currently fifteen agricultural operations within the Study area, with seven being within the Site boundary and eight being outside of the Site boundary.
- Walkers, cyclists, and horse riders as users of public rights of way – the potential impacts on users of public rights of way are summarised below.

4.8.2. On a precautionary basis, there is potential for reduced revenue for the businesses located inside the grounds of Claydon House assuming a worst case scenario that these businesses are reliant on custom from visitors that are mainly in the local area to visit Claydon House. The impact would either be **slight** and **not significant** effect or a **moderate** and **significant** effect depending on the conclusions of the Cultural Heritage Assessment undertaken within the Environmental Statement. The potential for adverse effects to these businesses is highlighted at this stage only as a precaution as the preliminary heritage assessment has concluded there may or may not be significant effects to setting.

4.8.3. Based on a preliminary assessment and assuming adequate mitigation measures are in place, no significant effects on the agricultural operations are considered likely. However, without mitigation there could be a significant adverse effect on agricultural businesses.

4.8.4. An existing Public Right of Way in the northern section of Field E11 is proposed to be permanently diverted as a result of the placement of infrastructure within the existing public right of way alignment. This change would increase the length of the route by approximately 155 metres, which is considered **not significant**.

4.8.5. An additional footpath diversion is proposed west of Shrubs Wood and east of Field B4. This would lead to an decrease in the length of the public right of way of 312 metres which will lead to a **significant beneficial** long term effect for users of this part of the Public Right of Way network. Consideration to the design of this Public Right of Way will be given in the coming period and the significance of the public rights of way in the final design will be assessed within the Environmental Statement.

4.8.6. A new permissive footpath is proposed following the northern boundary of Field B20, then the perimeters of B17, B11 and B10. This permissive footpath would extend for approximately 1.9 kilometres and allow walkers only to cross the field before joining the existing public rights of way network near Shrubs Wood. This new footpath would bring new long term benefits through increased access for users of Public Rights of Way.

4.9. Transport and access

4.9.1. A detailed review of the transport and access issues has been undertaken. This has initially reviewed the existing transport links to the Site. Following detailed reviews, a series of traffic surveys and discussions with Buckinghamshire Council, the proposed access to Rosefield Solar Farm is proposed to be from the south, via Station Road/Dewes Lane, Snake Lane/Fiddlers Field and Claydon Road.

4.9.2. The proposed access route avoids construction traffic passing through sensitive areas such as Botolph Claydon, Quainton, Edgcott and Calvert.

4.9.3. The majority of the Site would be accessed from a new access junction on Claydon Road. The Battery Energy Storage System area and Rosefield Substation would be accessed from a new junction on Granborough Road.

4.9.4. The indicative construction programme indicates a 30 month construction period. During the peak of construction, predicted to occur in Month 4, it is anticipated that 362 daily vehicle trips (218 Car and Light Goods Vehicles and 144 Heavy Goods Vehicle journeys) would access the Site.

4.9.5. An impact review of these additional traffic movements on the road network has been undertaken, with the highest impact occurring on Station Road/Dewes Lane, Snake Lane/Fiddlers Field and Granborough Road.

4.9.6. A series of mitigation measures and management plans have been proposed to help mitigate and offset the impacts of the construction phase traffic flows. A Draft Outline Construction Traffic Management Plan is

provided as part of the Preliminary Environmental Information Report and is based upon feedback provided at public consultation meetings, best practice, and examples from across the United Kingdom.

4.9.7. The Draft Outline Construction Traffic Management Plan includes the following measures:

- Proposed construction access route;
- Routes proposed to be barred to construction traffic;
- Indicative timing for construction traffic on the network;
- The creation of a Traffic Management Group, as part of the wider Community Liaison Group;
- Contractor selection including the requirements to adhere to the Considerate Constructors Scheme and Construction Logistics and Community Safety best practice guidance;
- General traffic management requirements;
- Road signage measures;
- Heavy Goods Vehicle requirements including identify requirements and data logging;
- A Wear and Tear Agreement with Buckinghamshire Council to protect the condition of local roads;
- Staff Travel Plan;
- Abnormal load Transport Management Plan;
- Onsite path management proposals;
- A number of passing places to be provided on Granborough Road;
- A management protocol and complaints process, including response times and commitments; and
- A liaison process with other future consented projects that may share the access routes.

4.9.8. A review of the proposed abnormal loads is being prepared and will accompany the Development Consent Order application. These movements are small in number and will be subject to a police escort as they arrive from the north via Winslow.

4.9.9. No link capacity issues are expected on any of the roads assessed due to the additional movements associated with Rosefield Solar Farm. The effects of construction traffic are temporary in nature and are transitory. Therefore, construction effects are predicted to be **not significant**.

4.9.10. The operational (including maintenance) phase would result in very low traffic volumes. These fall below the level required for assessment.

4.9.11. Prior to decommissioning of Rosefield Solar Farm, proposals for addressing the traffic impacts associated with decommissioning will be provided to the road authorities. This will be secured through the Development Consent Order, should Rosefield Solar Farm be approved.

4.10. Water

Flood risk

4.10.1. Rosefield Solar Farm is predominantly located in Flood Zone 1, with some areas of Flood Zone 2 and Flood Zone 3 located in the north-east area in Parcel 3, and a small area of Flood Zone 2 and 3 on the boundary of Parcel 1a.

4.10.2. There are several surface water overland flow routes identified across the Site. Generally, these overland flow routes are attributable to localised topographical depressions, some of which are indicative of minor ordinary watercourses, drains and headwaters of various watercourses.

4.10.3. Solar photovoltaic modules and vulnerable infrastructure are expected to be raised above modelled flood levels and areas of surface water flood risk to avoid any risk to Rosefield Solar Farm.

4.10.4. The addition of the proposed infrastructure would not have a significant effect on floodplain storage or off-site flood risk, meaning the likely effect of Rosefield Solar Farm on flood risk is anticipated to be **not significant**.

4.10.5. Buffers are proposed between infrastructure and ordinary watercourse channels in line with guidance from the Lead Local Flood Authority.

4.10.6. A Flood Risk Assessment will be undertaken and form part of the Environmental Statement to evaluate flood risk, including an assessment of climate change effects for Rosefield Solar Farm's lifetime.

Water quality

4.10.7. There is a potential risk of increased runoff from hard surfaces or containerised infrastructure. Limiting or dispersing such infrastructure and using permeable materials for Site access tracks would promote rainfall percolation as per the existing Site. A formal drainage strategy will help manage runoff rates and is expected to include mitigation to protect surface and groundwater.

4.10.8. Where cable routes need to cross watercourses, trenchless techniques (i.e. horizontal directional drilling) will be used to minimise impacts on the watercourses, if practicable.

4.10.9. The stopping of existing agricultural activities would lead to less compaction and therefore, improvements in soil structure. A reduction in

herbicide and fertilizer use would result in a reduction of pollution to groundwater and surface water resources.

4.10.10. Residual risk may include localised compaction caused by vehicle movement or the spillage of harmful substances. However, negative impacts would be limited to a small area and would have little to no effect on the water quality of the local watercourse network.

4.10.11. The Outline Construction and Decommissioning Environmental Management Plans, which will be submitted in support of the Development Consent Order application, will document how the risk of increased runoff would be mitigated during construction and decommissioning. Possible mitigation measures include constructing and using access tracks early in the programme, planting riparian vegetation early in the programme where possible, and appropriate storage of pollutants.

4.10.12. Any residual effects on the water environment during the construction and decommissioning of Rosefield Solar Farm would be **not significant**. The operation (including maintenance) of Rosefield Solar Farm has the potential to have a **beneficial**, but **not significant** effect on the water environment.

4.11. Glint and glare

4.11.1. Although solar panels are designed to absorb rather than reflect sunlight, they have potential to cause a brief flash of bright light typically received by moving receptors or from moving reflectors (‘glint’) or a continuous source of bright light typically received by stationary receptors or from large reflectors (‘glare’).

4.11.2. The preliminary glint and glare assessment has considered residential receptors, major roads and railway lines within 1 kilometre of Rosefield Solar Farm, and any airfields or airports within 10 kilometres of the Rosefield Solar Farm.

4.11.3. Any significant glint and glare effects on ground-based infrastructure (houses, railway and roads) are solved with mitigation strategies in the form of tree barriers with evergreen species, which keep their leaves on in all seasons. There are no expected effects on aviation activity.

4.11.4. Following the implementation of mitigation, it is anticipated that effects for glint and glare would be **not significant**.

4.12. Other environmental considerations

Heat and radiation

4.12.1. Due to the scale and nature of Rosefield Solar Farm, it is not anticipated that there would be any significant sources of heat or radiation during construction, operation (including maintenance) or decommissioning.

Electric, magnetic and electromagnetic fields

4.12.2. Rosefield Solar Farm includes electrical infrastructure that, when operational, would produce electric and magnetic fields. Electric and magnetic fields arise from the generation, transmission, distribution and use of electricity and can impact on human health and ecological receptors. However, the voltage of the cables does not exceed the threshold of 132 kilovolts (as set out in health protection guidelines) and Rosefield Solar Farm is expected to incorporate offsets between electrical infrastructure and residential properties and public rights of way to avoid the potential for any electromagnetic effects on sensitive receptors. The electric and magnetic fields effects during the construction, operation (including maintenance) and decommissioning of Rosefield Solar Farm are likely to be **not significant**.

Major accidents and disasters

4.12.3. The construction, operational (including maintenance) and decommissioning phases of Rosefield Solar Farm may give rise to major accidents and/or disasters such as those outlined below; however, they can be mitigated as described below or in the relevant section of this Non-Technical Summary:

- Flooding – The majority of Rosefield Solar Farm is located in Flood Zone 1 and is at low risk of surface water flooding and is not considered to be at significant risk of flooding. See **Section 4.10** ('Water') of this Non-Technical Summary for more information.
- Fire – there is a potential fire risk associated with the Battery Energy Storage System. Cooling systems and siting of Battery Energy Storage System components a suitable distance from sensitive receptors would minimise this risk. An Outline Battery Safety Management Plan will be submitted in support of the Development Consent Order application and would document relevant mitigation.
- Aircraft disasters – see **Section 4.11** ('Glint and glare') of this Non-Technical Summary.
- Plant disease – new planting could be susceptible to pests and disease. Risks would be managed through the Outline Landscape and Ecological Management Plan, to be submitted in support of the Development Consent Order application.

4.12.4. The proposed embedded mitigation and the implementation of safety standards and legislation mean that effects in relation to major accidents and disasters are anticipated to be **not significant** during any phase of Rosefield Solar Farm.

Utilities

4.12.5. Utilities considered include underground internet cables, water and sewer pipes, and overhead electricity cables. Rosefield Solar Farm has the potential to affect existing utility infrastructure located at the Site. Given the nature of Rosefield Solar Farm, potential impacts to existing utility assets would be limited to the construction phase. Risks will be managed through the Outline Construction Environmental Management Plan (to be submitted in support of the Development Consent Order application), along with protective provisions. It is therefore anticipated that effects will be **not significant** as a result of Rosefield Solar Farm

Human health

4.12.6. The likely effects of Rosefield Solar Farm on human health are considered within the respective relevant environmental assessments, which are summarised in the following sections of this Non-Technical Summary: **Section 4.1** ('Air quality'), **Section 4.6** ('Landscape and visual'), **Section 4.7** ('Noise and vibration'), **Section 4.8** ('Population'), **Section 4.9** ('Transport and access'), and **Section 4.11** ('Glint and glare'). All of these concluded in their respective assessments that any likely effects would be **not significant**.

4.12.7. Potential cumulative effects to human health are considered, with the overall approach to cumulative assessment summarised in **Section 4.13** ('Cumulative effects') of this Non-Technical Summary.

Material assets and waste

4.12.8. The main potential effects relating to material assets and waste are depletion of resources and unsustainable use of resources, which could lead to degradation of the natural environment.

4.12.9. Indirect impacts associated with materials consumption and waste disposal (for example release of greenhouse gas emissions, water consumption, amenity impacts, ecological impacts) are incorporated in other environmental assessments, which are summarised in **Section 4.2** ('Biodiversity'), **Section 4.3** ('Climate)', **Section 4.6** ('Landscape and Visual') and **Section 4.10** ('Water') of this Non-Technical Summary. Of these assessments, the one with the most direct links to material assets and waste is climate, the preliminary assessment for which concludes that no likely significant adverse effects are anticipated, with **significant beneficial** effects anticipated in relation to greenhouse gas displacement.

4.12.10. Potential streams and volumes of materials and waste disposal would be described within the Environmental Statement. The Outline Construction Environmental Management Plan (including a Site Waste Management Plan) and the Outline Decommissioning Environmental Management Plan (both of which will be submitted in support of the Development Consent Order application) will set out how waste would be recycled or disposed of.

Transboundary effects

4.12.11. Due to the nature and location of Rosefield Solar Farm, it is not anticipated that Rosefield Solar Farm would lead to any likely significant effects on the environment of a European Economic Association State.

4.13. Cumulative effects

Intra-project cumulative effects

4.13.1. Different environmental effects from Rosefield Solar Farm could occur concurrently on certain receptors.

4.13.2. Receptors that could experience more than one environmental effect at the same time include local residents and users of public rights of way, ecological receptors, heritage assets such as listed buildings and conservation areas, and land, soils and water. For example, combined effects on human receptors, such as local residents, could arise from air quality (dust), visual and noise impacts.

4.13.3. A preliminary overview of potential cumulative effects is presented in **Table 18.1, Chapter 18** in **Volume 1** of the Preliminary Environmental Information Report. At this stage, it is anticipated that effects would be **not significant**. A full detailed assessment of such effects will be undertaken and detailed within the Environmental Statement.

Inter-project cumulative effects

4.13.4. There is potential for significant environmental effects of Rosefield Solar Farm to occur cumulatively with those of other existing development and/or approved development.

4.13.5. Other existing development and/or approved developments included in the preliminary cumulative assessment have been selected based on identifying developments that:

- have the same Zone of Influence as Rosefield Solar Farm for at least one environmental factor;
- have temporal crossover in the proposed dates for construction, operation and/or decommissioning; and
- are of a scale and nature where a significant effect is likely.

4.13.6. Other existing development and/or approved developments include consented and proposed solar schemes in proximity to Rosefield Solar Farm.

4.13.7. A high-level overview of potential cumulative effects based on the short-listed other existing development and/or approved developments presented in **Table 18.3, Chapter 18** in **Volume 1** of the Preliminary

Environmental Information Report, has been undertaken. At this stage, it is anticipated that for air quality; biodiversity; cultural heritage; land, soil and groundwater; landscape and visual; noise and vibration; and glint and glare, there is potential for **significant** cumulative effects with one or more of the following developments:

- National Grid East Claydon Substation Extension;
- Rookery Farm Battery Energy Storage System;
- Proposed solar farm at Tuckey Farm;
- High Speed 2 (and associated applications);
- East West Rail;
- Grendon Prison;
- Calvert Landfill Solar Park; and
- Battery Energy Storage System facility.

4.13.8. Further information and engagement are required to inform the detailed assessment of cumulative effects that will be undertaken for the Environmental Statement.

4.13.9. Discussions with Buckinghamshire Council in relation to agreement on study areas and methodology for the assessment of cumulative effects (including agreement on the list of other existing development and/or approved developments) will be undertaken as part of the ongoing Environmental Impact Assessment process and will inform the assessment of cumulative effects to be reported within the Environmental Statement.

5. Next steps

5.1.1. The statutory consultation period for Rosefield Solar Farm runs from Wednesday 18 September until Thursday 14 November. More information can be found at the consultation website (rosefieldsolarfarm.co.uk). As previously mentioned, the Preliminary Environmental Information Report, to which this Non-Technical Summary relates, is intended to enable interested parties, including members of the public, to understand the likely significant environmental effects of Rosefield Solar Farm to help inform their consultation responses.

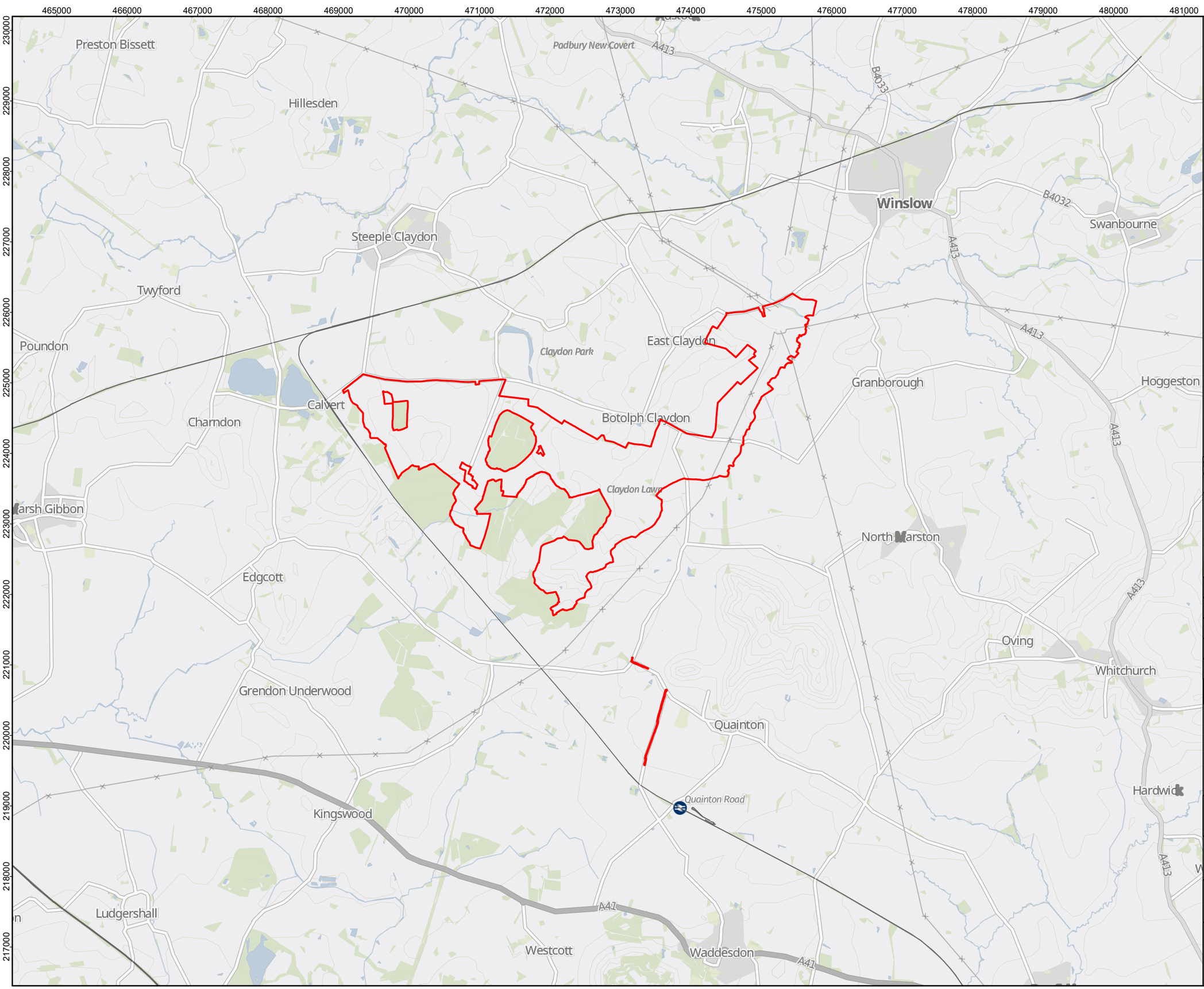
5.1.2. There are a number of ways to respond to the consultation:

- By returning a feedback form at the in-person consultation events (see the above website for details).
- By sending feedback to: ROSEFIELD SOLAR FARM FREEPOST SEC NEWGATE UK LOCAL (no stamp required).
- By completing the feedback form on the above website.
- By email (info@rosefieldsolarfarm.co.uk).

5.1.3. Any feedback that is received through the consultation process will be considered alongside further information gained through on-going technical work to inform the ongoing design of Rosefield Solar Farm.

Appendix A

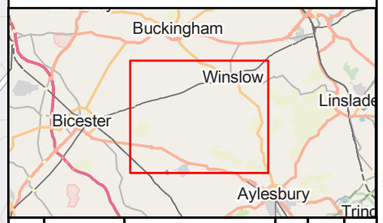
Figures



LEGEND:

Indicative Site Boundary

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936
Units: Meter



Rev	Date	Description	Drn	Chk	App
01	08/08/2024	PEIR issue	LDA	LDA	LDA

Rosefield Solar Farm

Rosefield Solar Farm

DOCUMENT:
ROSEFIELD SOLAR FARM

TITLE:
Location Plan

FIGURE NUMBER:
1

0 0.5 1
Kilometers

Scale: 1:50,000 @ A3

REV 01

Path: Z:\8478_EDF_Renewables_Project_Custodian\8gis\Projects\PEIR_Figures\8478_PEIR_Fig2.1_Location_Plan_Rev01.aprxMap

Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri, Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack, National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

LEGEND:

Indicative Site Boundary

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936
Units: Meter

Rev	Date	Description	Drn	Chk	App
01	08/08/2024	PEIR issue	LDA	LDA	LDA

Rosefield Solar Farm

Rosefield Solar Farm

DOCUMENT:
ROSEFIELD SOLAR FARM

TITLE:
Site Boundary

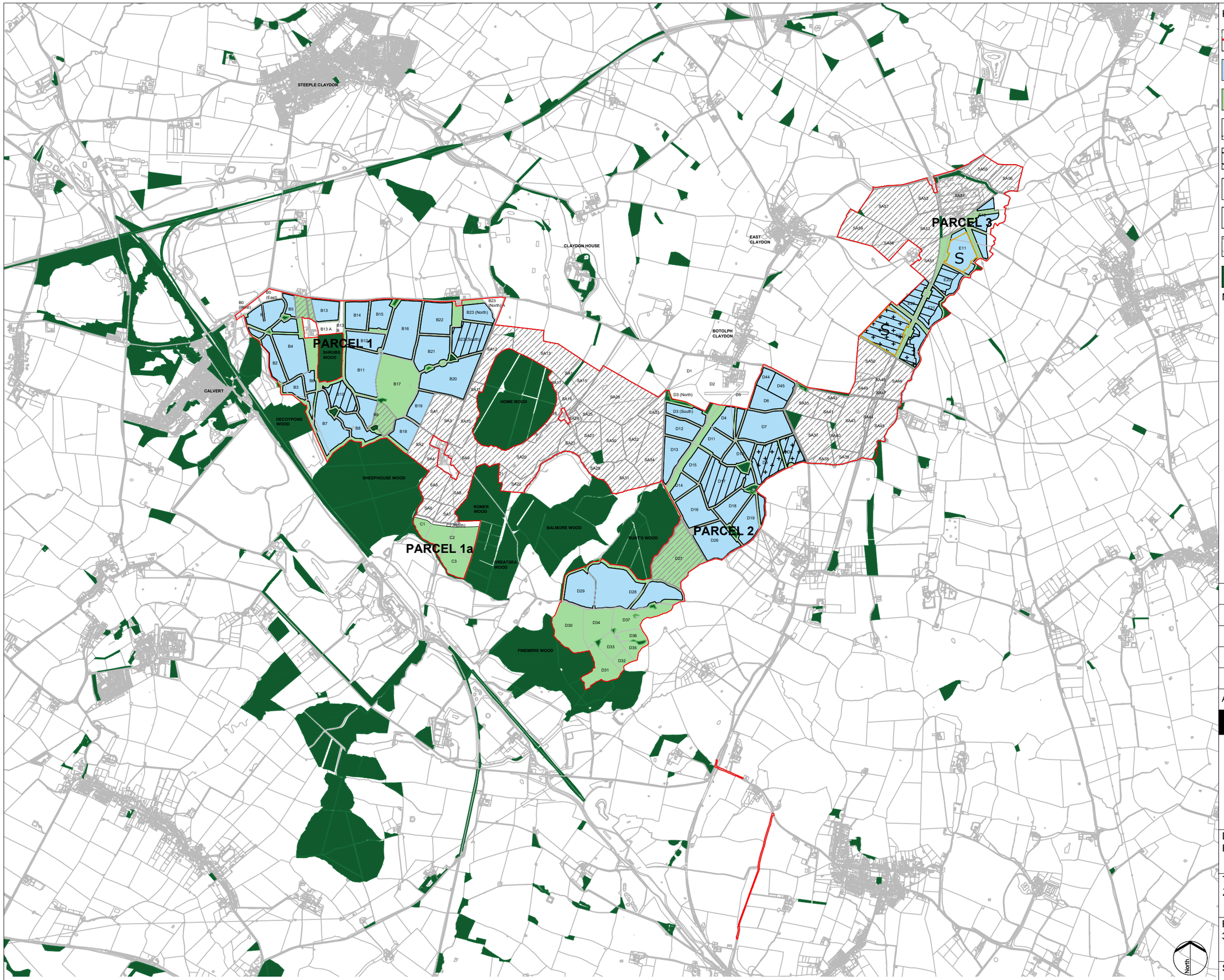
FIGURE NUMBER:
2

0 0.5 1
Kilometers
Scale: 1:30,000 @ A3

REV 01

Path: Z:\8478_EDF_Renewables_Project_Custodian\8gis\Projects\PEIR_Figures\8478_PEIR_Fig1.1_Site_Boundary_Rev01.aprxMap

National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.



KEY:

- Indicative Site Boundary
- Indicative area for Solar PV development
- Indicative area for mitigation and/or enhancement
- Indicative siting zone for BESS
- Indicative siting zone for Main Collector Compound
- Indicative siting zone for Satellite Collector Compounds
- Indicative siting zone for Rosefield Substation
- Area for underground cable routes, access tracks and temporary construction compounds (locations to be determined)
- Existing Woodland

NOTES:

1. The location of features shown are indicative only. Exact locations to be confirmed on site.
2. Additional features may be present on site that have not been identified on the topographical plan.
3. Parameter plan drawings are based on OS MasterMap information.
4. The following components are not shown on the drawing: internal cable route corridors, boundary fencing and CCTV, inverter and transformers and switchgear compounds, internal access tracks, drainage, construction access and compounds.

App	Date	Description	Drn	Chk	App
05	08/08/2024	PEIR issue	LDA	RK	RK
04	05/07/2024	Fourth Draft	LDA	RK	RK
03	25/06/2024	Third Draft	LDA	RK	RK
02	06/06/2024	Second Draft	LDA	RK	RK
01	17/05/2024	First Draft	LDA	RK	RK

Rosefield Solar Farm

Rosefield Solar Farm

DOCUMENT:
ROSEFIELD SOLAR FARM

TITLE:
ZONAL MASTERPLAN

FIGURE NUMBER:
3

SCALE : 1:30,000 @ A3

REV:
P05

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LEGEND:

- Site Boundary
- B12 Field Referencing System
- National Cycle Network - On Road
- Surface Water Line
- Surface Water Area
- Flood Zone 2
- Flood Zone 3
- Ancient & Semi-Natural Woodland
- Ancient Replanted Woodland
- National Forest Inventory 2021
- Sites of Special Scientific Interest
- Conservation Areas
- Registered Parks and Gardens
- Scheduled Monuments
- Historic Landfill Sites
- HS2 Works
- Cable Search Corridor

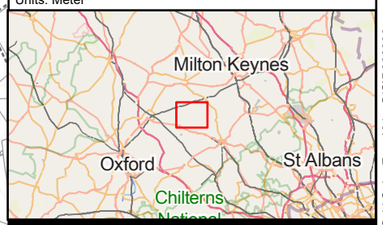
National Grid

- Towers
- Overhead Lines
- Substations

Listed Building

- I
- II
- II*

NOTES:
Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936
Units: Meter



Rosefield Solar Farm

Rosefield Solar Farm

DOCUMENT:
ROSEFIELD SOLAR FARM

TITLE:
Environmental Features Plan

FIGURE NUMBER:
4

0 0.5 1
Kilometers
Scale: 1:30,000 @ A3

REV 07
KEY 001

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Application Document Ref: EN010158/APP/5.2
Planning Inspectorate Scheme Ref: EN010158