



Kingsway Solar Farm

EIA Scoping Report

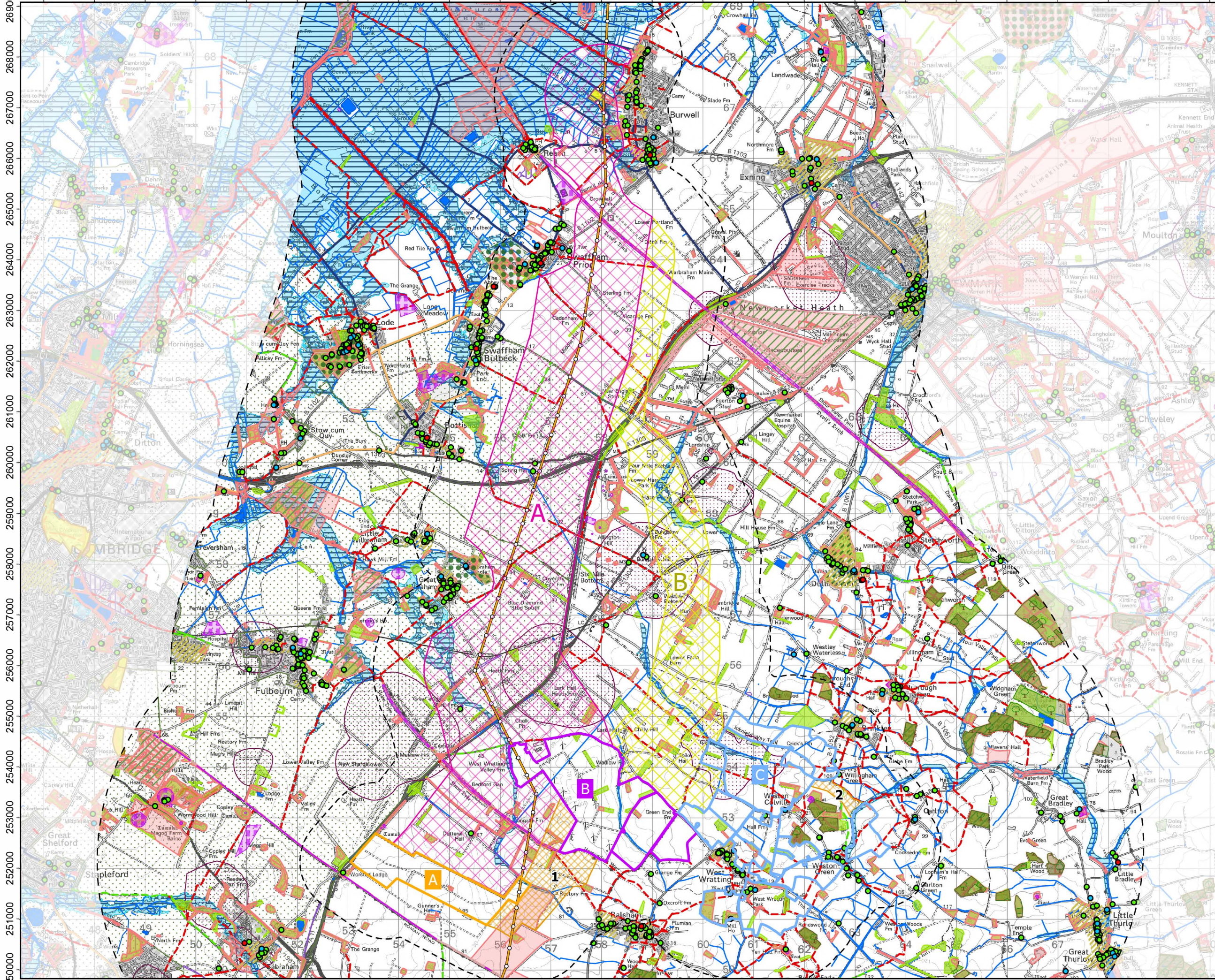
Appendices – Part 1

December 2024

APPENDIX A: ENVIRONMENTAL AND PLANNING FEATURES

NOTE: The figures only display the datasets visible within the area (e.g. if there are no Sites of Special Scientific Interest (SSSI) within the area, neither the figure nor legend will present them).

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Legend:

Scheme Components

- Area A - West
- Area B - Central
- Area C - East
- Inter Array Connection Corridor
- Grid Connection Corridor A
- Grid Connection Corridor B
- 1km and 5km Component Boundary Buffers

Existing National Grid Infrastructure

- National Grid Substations
- National Grid Towers
- National Grid OHL (400kV)

Heritage

- Grade I Listed Building
- Grade II Listed Building
- Grade II* Listed Building
- Conservation Areas
- Scheduled Monuments
- Registered Parks and Gardens

Ecology

- Ancient & Semi-Natural Woodland
- Ancient Replanted Woodland
- Ramsar
- Local Nature Reserves
- National Nature Reserves
- Sites of Special Scientific Interest
- Special Areas of Conservation
- Priority Habitats Inventory
- National Forest Inventory

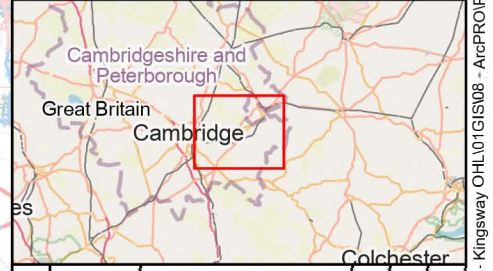
Landscape, Recreation and Population

- Public Rights of Way
- Public Rights of Way (Bridleway)
- National Cycle Network - TrafficFree
- National Cycle Network - OnRoad
- Green Belt
- Built Up Areas

Water and Land Use

- Historic Landfill Sites
- Inner Source Protection Zones
- Watercourses
- Waterbodies
- Flood Zone 3
- Flood Zone 2

Coordinate System: British National Grid
 Projection: Transverse Mercator
 Datum: OSGB 1936
 Units: Meter

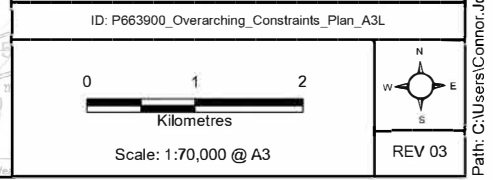


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03	11/12/2024	Added PRoW	CJ	CP	CP
02	06/12/2024	Updated Labels & Legend	CJ	CP	CP
01	14/11/2024	Symbology Changes	CJ	CP	CP

663900 - Kingsway Solar Farm

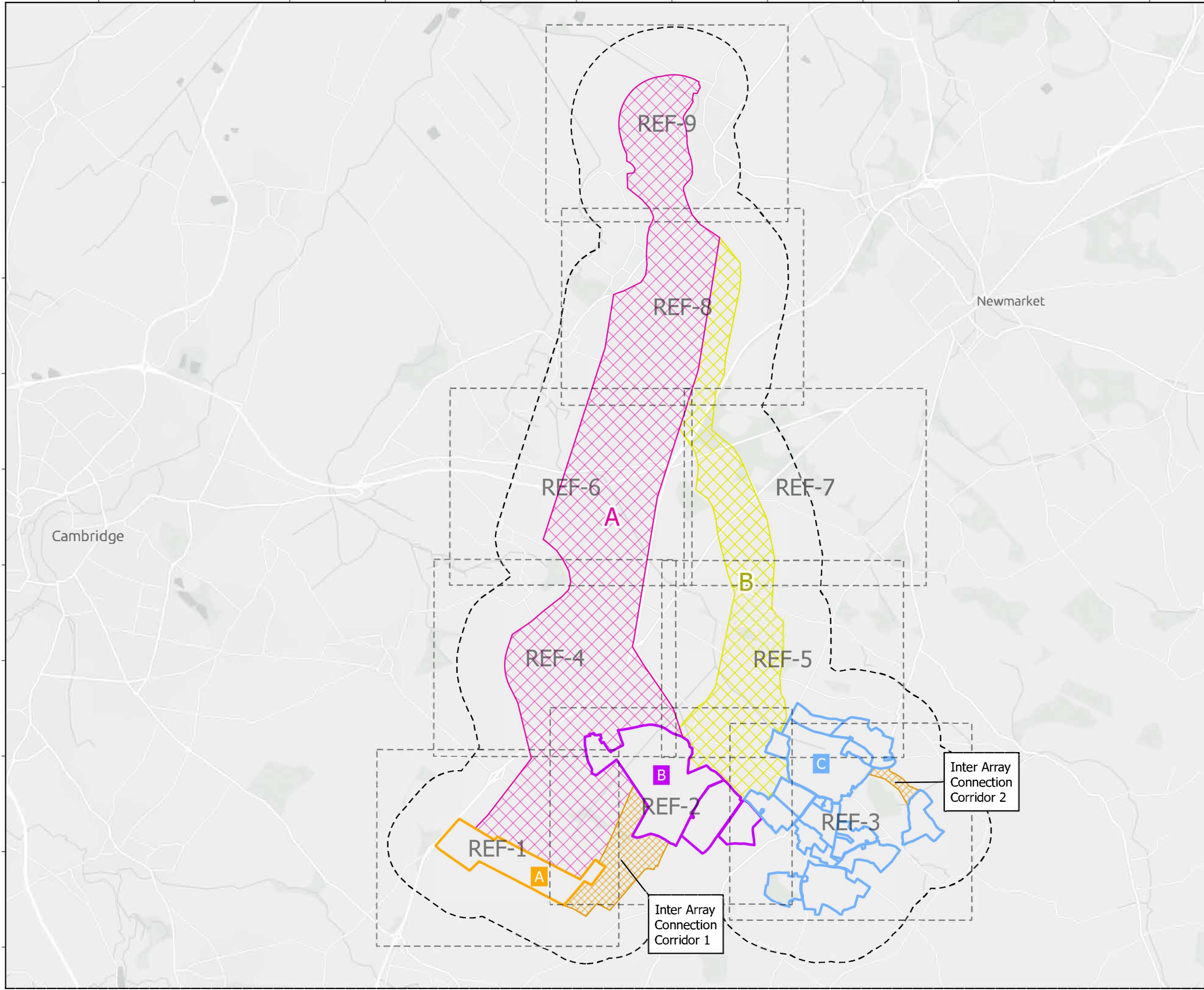
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Legend:

- Reference Grid
- Scheme Components**
 - Area A - West
 - Area B - Central
 - Area C - East
 - Inter Array Connection Corridor
 - Grid Connection Corridor A
 - Grid Connection Corridor B
 - 1km Component Boundary Buffer

Coordinate System: British National Grid
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 Datum: OSGB 1936
 Units: Meter



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03	11/12/2024	Updated Figure Title	CJ	CP	CP
02	06/12/2024	Updated Labels & Legend	CJ	CP	CP
01	14/11/2024	Symbology Changes	CJ	CP	CP

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TITLE: Appendix A-0:
 Environmental Features - Reference
 Guide

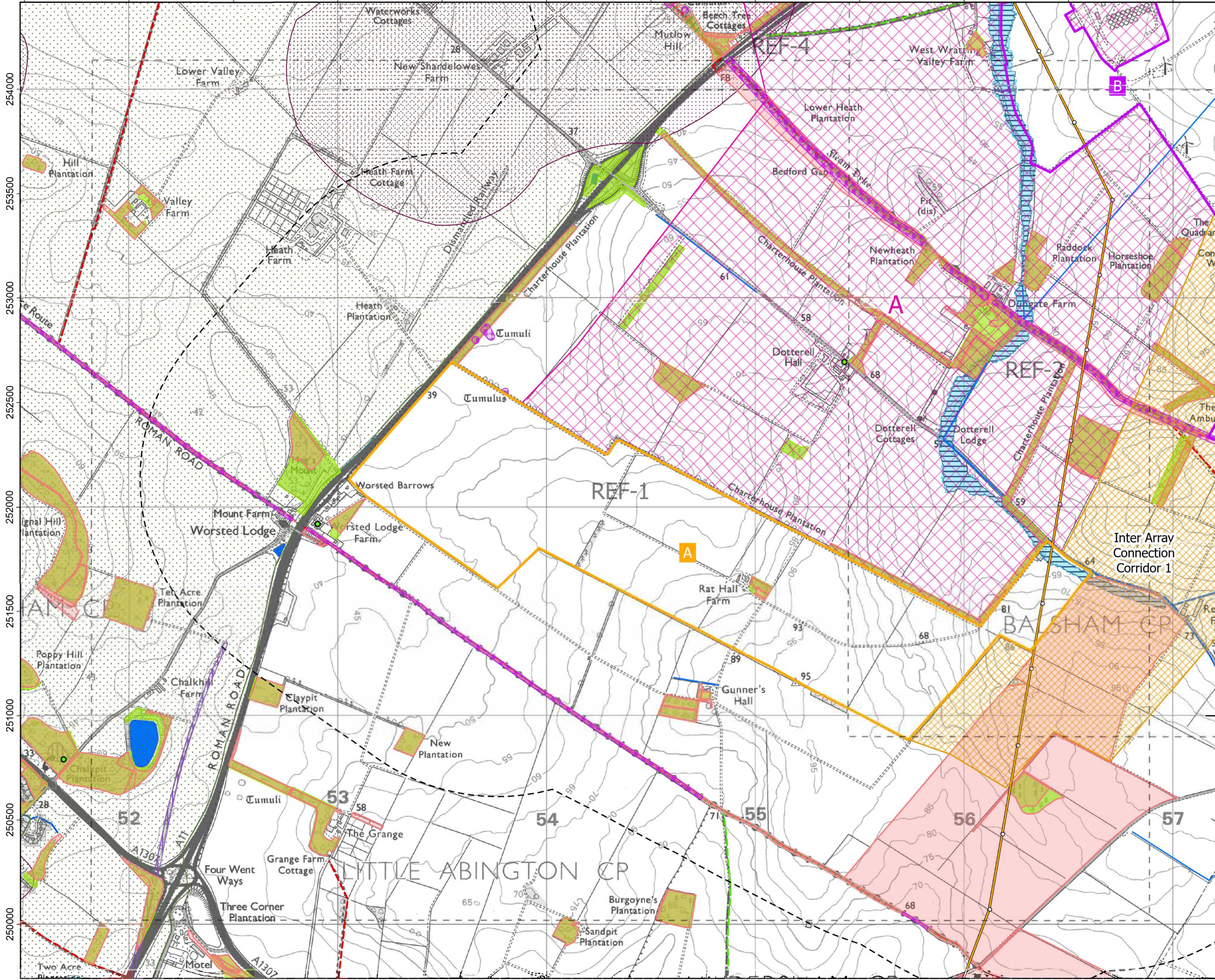
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REV 03

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- Legend:**
- Reference Grid
 - Scheme Components**
 - Area A - West
 - Area B - Central
 - Inter Array Connection Corridor
 - Grid Connection Corridor A
 - 1km and 5km Component Boundary Buffers
 - Existing National Grid Infrastructure**
 - National Grid Towers
 - National Grid OHL (400kV)
 - Heritage**
 - Grade II Listed Building
 - Conservation Areas
 - Scheduled Monuments
 - Ecology**
 - Sites of Special Scientific Interest
 - Priority Habitats Inventory
 - National Forest Inventory
 - Landscape, Recreation and Population**
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 - Public Rights of Way (Bridleway)
 - Green Belt
 - Built Up Areas
 - Water and Land Use**
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 - Watercourses
 - Waterbodies
 - Flood Zone 3
 - Flood Zone 2

Coordinate System: British National Grid
 Projection: Transverse Mercator
 Datum: OSGB 1936
 Units: Meter



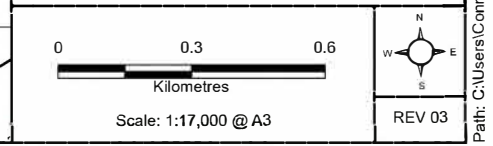
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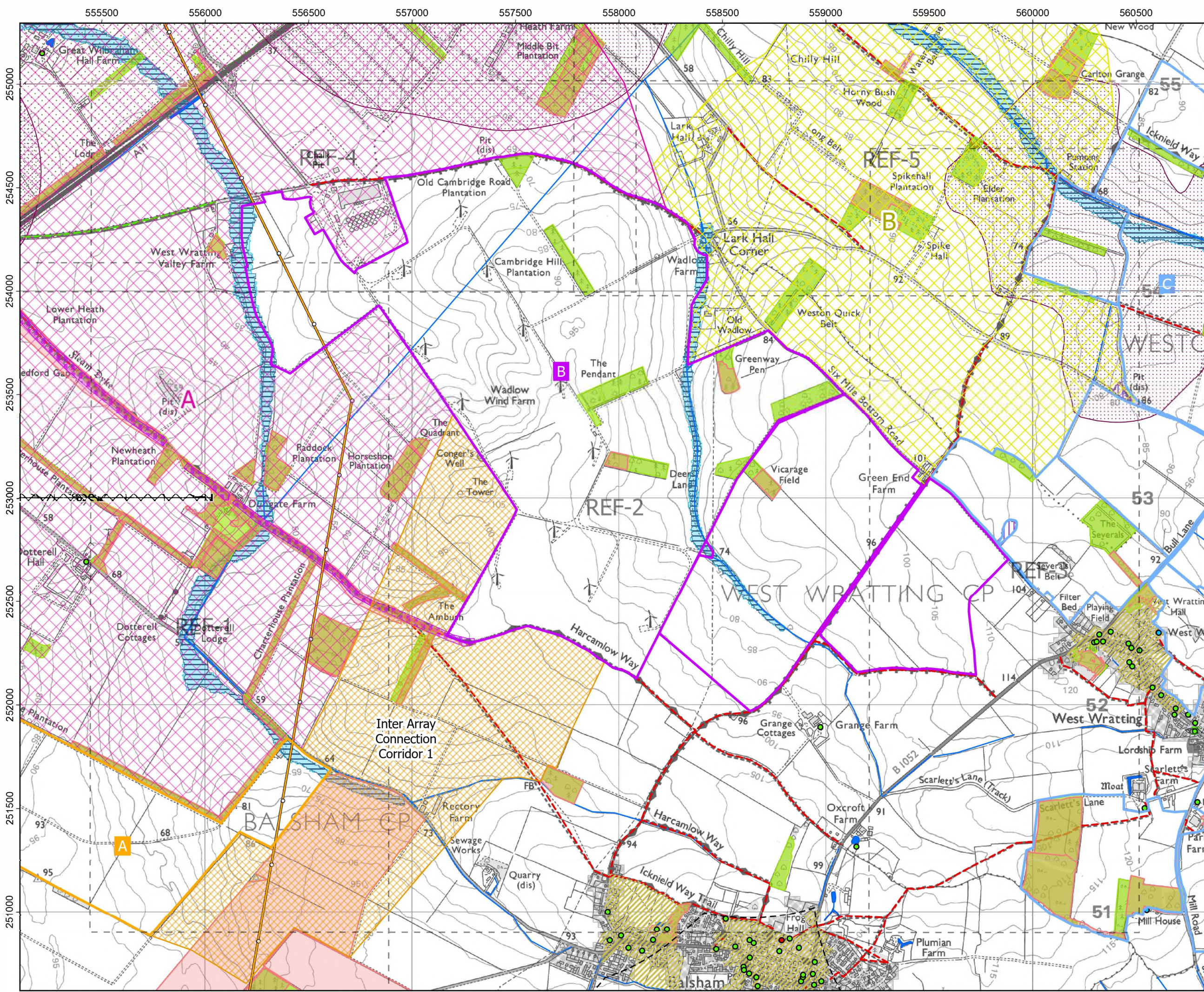
663900 - Kingsway Solar Farm



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Environmental Features REF-1

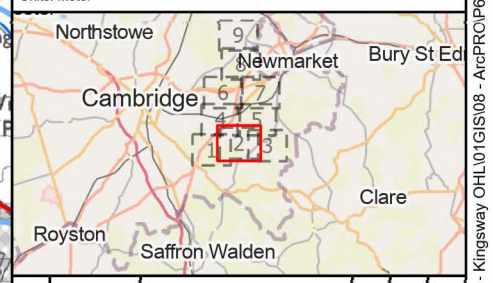
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- Legend:**
- Reference Grid
 - Scheme Components**
 - Area A - West
 - Area B - Central
 - Area C - East
 - Inter Array Connection Corridor
 - Grid Connection Corridor A
 - Grid Connection Corridor B
 - 1km and 5km Component Boundary Buffers
 - Existing National Grid Infrastructure**
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Coordinate System: British National Grid
 Projection: Transverse Mercator
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 Units: Meter



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02	06/12/2024	Updated Labels & Legend	CJ	CP	CP
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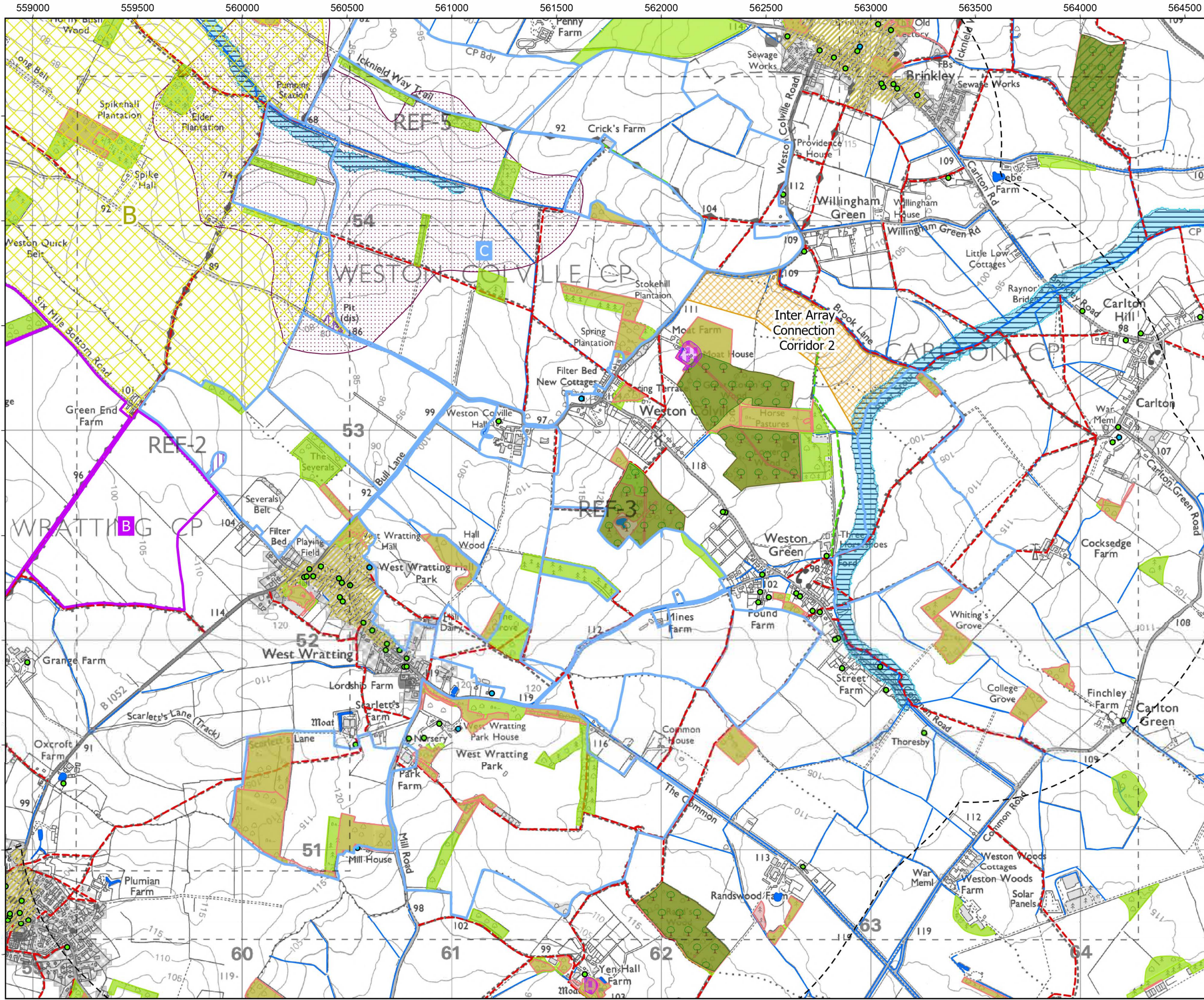
663900 - Kingsway Solar Farm

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REV 03



- Legend:**
- Reference Grid
 - Scheme Components**
 - Area B - Central
 - Area C - East
 - Inter Array Connection Corridor
 - Grid Connection Corridor B
 - 1km and 5km Component Boundary Buffers
 - Heritage**
 - Grade II Listed Building
 - Grade II* Listed Building
 - Conservation Areas
 - Scheduled Monuments
 - Ecology**
 - Ancient & Semi-Natural Woodland
 - Sites of Special Scientific Interest
 - Priority Habitats Inventory
 - National Forest Inventory
 - Landscape, Recreation and Population**
 - Public Rights of Way
 - Public Rights of Way (Bridleway)
 - Built Up Areas
 - Water and Land Use**
 - Historic Landfill Sites
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 - Watercourses
 - Waterbodies
 - Flood Zone 3
 - Flood Zone 2

Coordinate System: British National Grid
 Projection: Transverse Mercator
 Datum: OSGB 1936
 Units: Meter



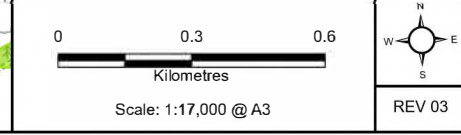
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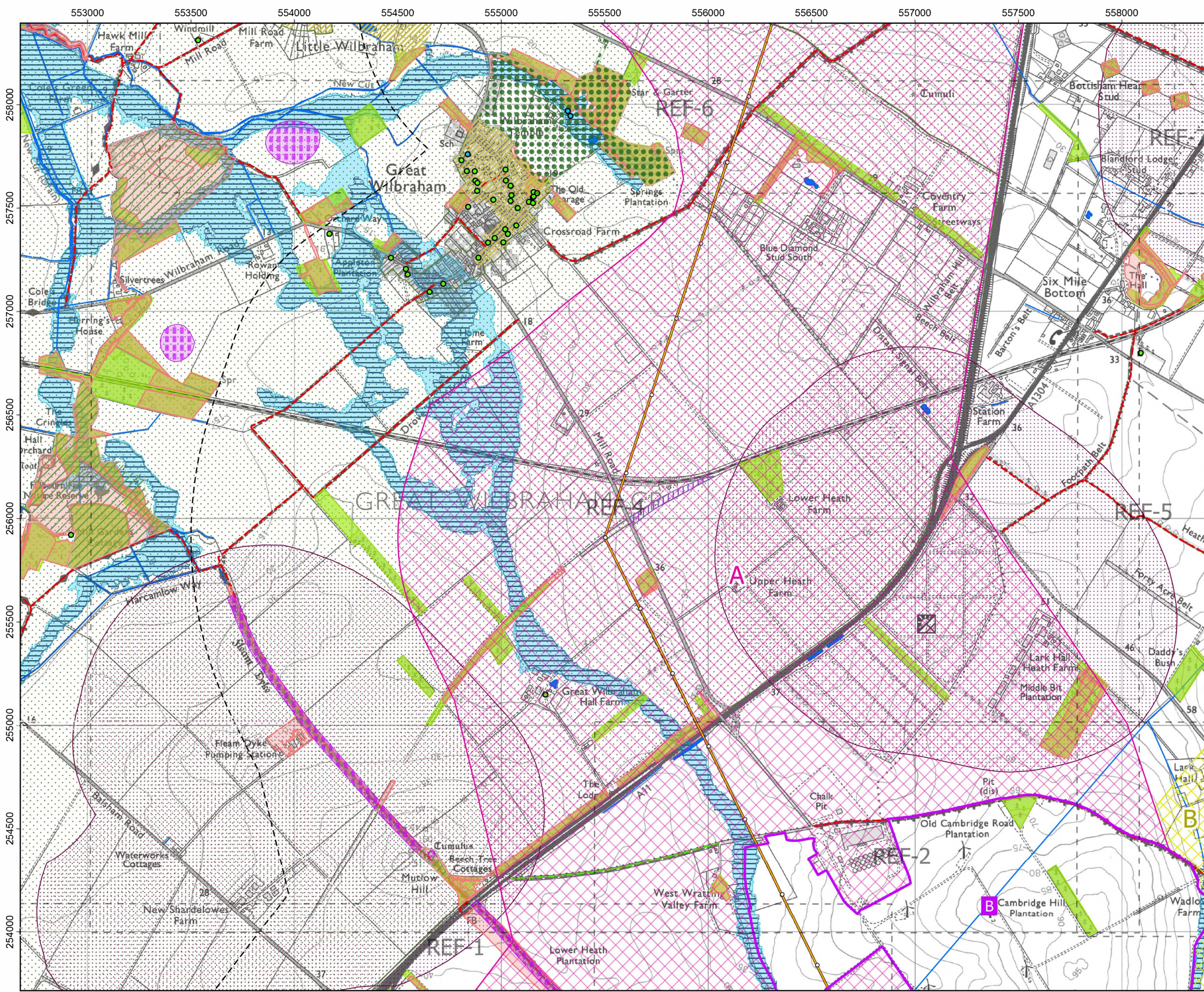
663900 - Kingsway Solar Farm



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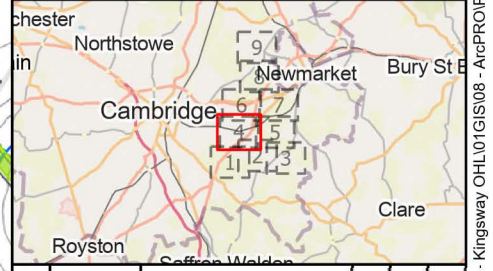
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- Legend:**
- Reference Grid
 - Scheme Components**
 - Area B - Central
 - Grid Connection Corridor A
 - Grid Connection Corridor B
 - 1km and 5km Component Boundary Buffers
 - Existing National Grid Infrastructure**
 - National Grid Towers
 - National Grid OHL (400kV)
 - Heritage**
 - Grade II Listed Building
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03	11/12/2024	Added PRoW	CJ	CP	CP
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663900 - Kingsway Solar Farm

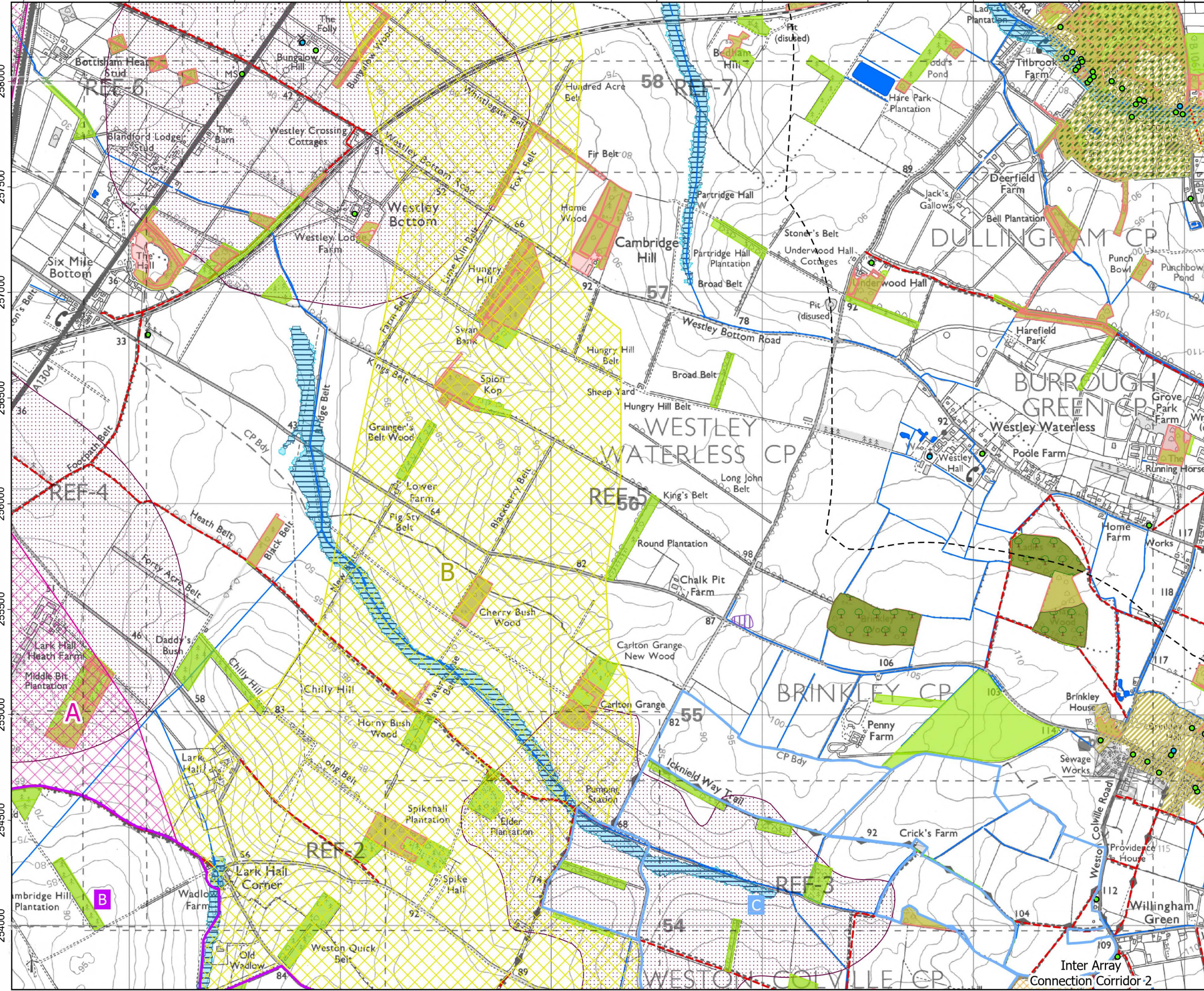
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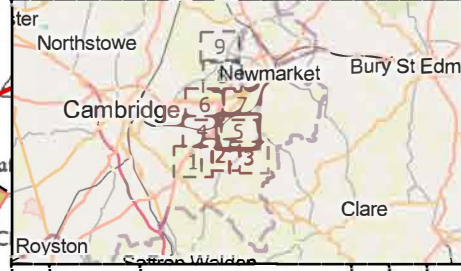
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 - Scheme Components**
 - Area B - Central
 - Area C - East
 - Inter Array Connection Corridor
 - Grid Connection Corridor A
 - Grid Connection Corridor B
 - 1km and 5km Component Boundary Buffers
 - Heritage**
 - Grade I Listed Building
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 - Grade II* Listed Building
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 - Ecology**
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Coordinate System: British National Grid
 Projection: Transverse Mercator
 Datum: OSGB 1936
 Units: Meter



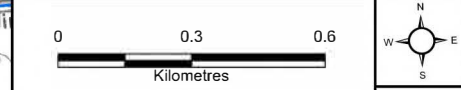
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663900 - Kingsway Solar Farm

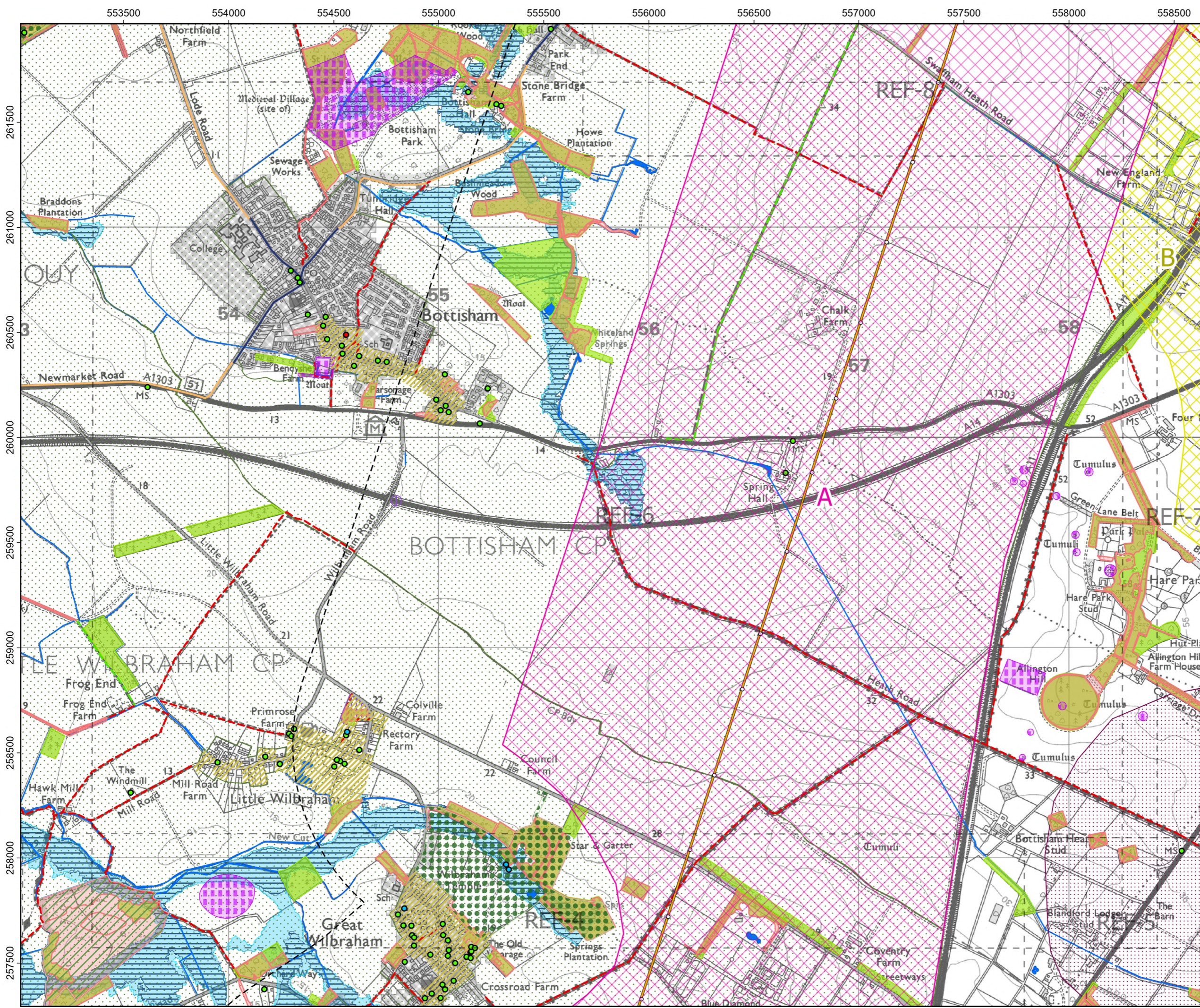


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- Legend:**
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 - Scheme Components**
 - Grid Connection Corridor A
 - Grid Connection Corridor B
 - 1km and 5km Component Boundary Buffers
 - Existing National Grid Infrastructure**
 - National Grid Towers
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Coordinate System: British National Grid
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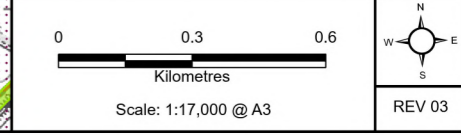
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663900 - Kingsway Solar Farm

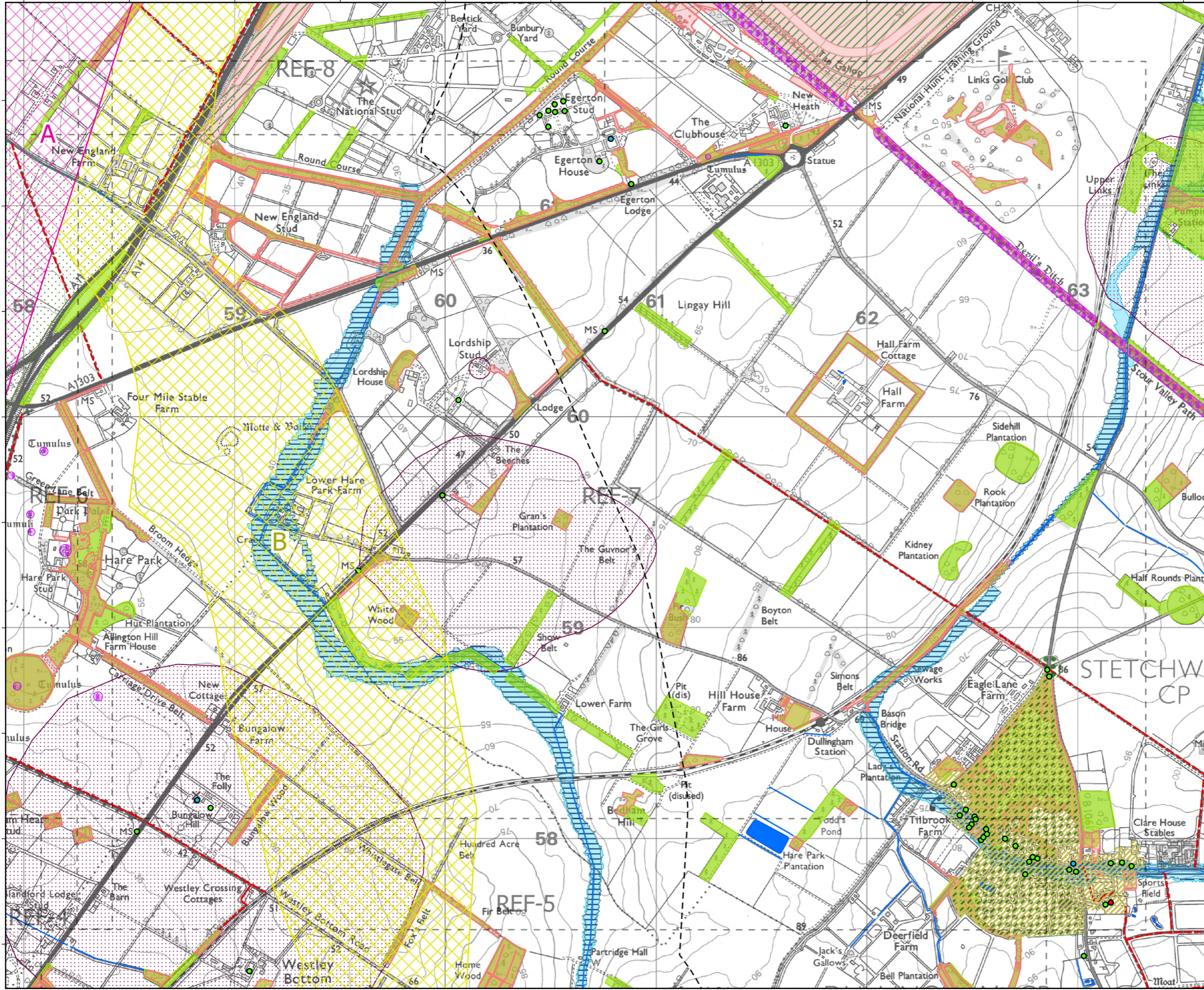


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ID: P663900_Constraints_Plan_A3L_REF



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- Legend:**
- Reference Grid
 - Scheme Components**
 - Grid Connection Corridor A
 - Grid Connection Corridor B
 - 1km and 5km Component Boundary Buffers
 - Heritage**
 - Grade I Listed Building
 - Grade II Listed Building
 - Grade II* Listed Building
 - Conservation Areas
 - Scheduled Monuments
 - Registered Parks and Gardens
 - Ecology**
 - Sites of Special Scientific Interest
 - Special Areas of Conservation
 - Priority Habitats Inventory
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Coordinate System: British National Grid
 Projection: Transverse Mercator
 Datum: OSGB 1936
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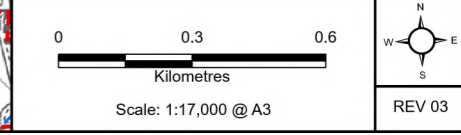
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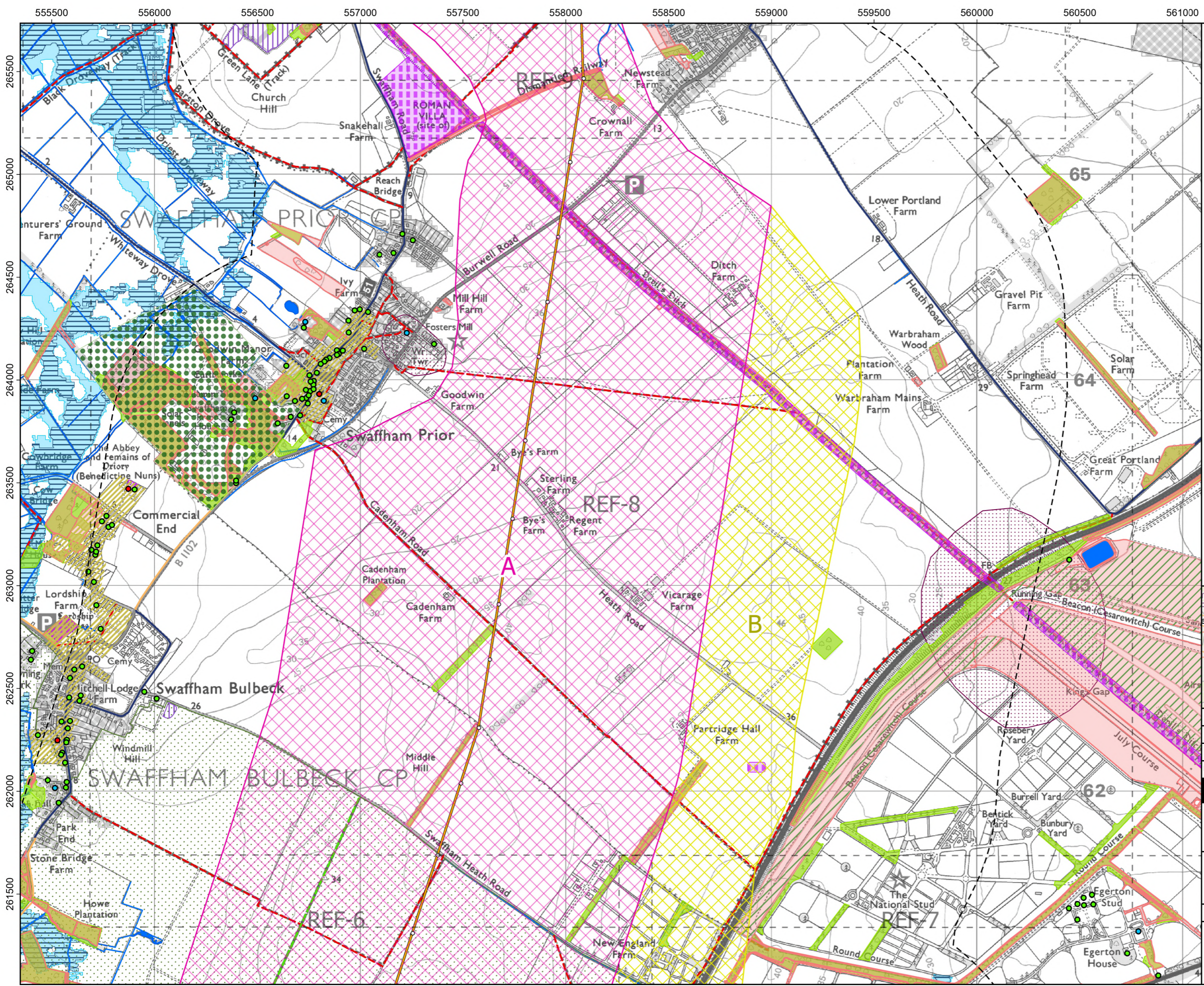
663900 - Kingsway Solar Farm



TITLE: Appendix A-7:
 Environmental Features REF-7

ID: P663900_Constraints_Plan_A3L_REF





- Legend:**
- Reference Grid
 - Scheme Components**
 - Grid Connection Corridor A
 - Grid Connection Corridor B
 - 1km and 5km Component Boundary Buffers
 - Existing National Grid Infrastructure**
 - National Grid Towers
 - National Grid OHL (400kV)
 - Heritage**
 - Grade I Listed Building
 - Grade II Listed Building
 - Grade II* Listed Building
 - Conservation Areas
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 - National Forest Inventory
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 - Public Rights of Way
 - Public Rights of Way (Bridleway)
 - National Cycle Network - TrafficFree
 - National Cycle Network - OnRoad
 - Green Belt
 - Built Up Areas
 - Water and Land Use**
 - Historic Landfill Sites
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 - Watercourses
 - Waterbodies
 - Flood Zone 3
 - Flood Zone 2

Coordinate System: British National Grid
 Projection: Transverse Mercator
 Datum: OSGB 1936
 Units: Meter



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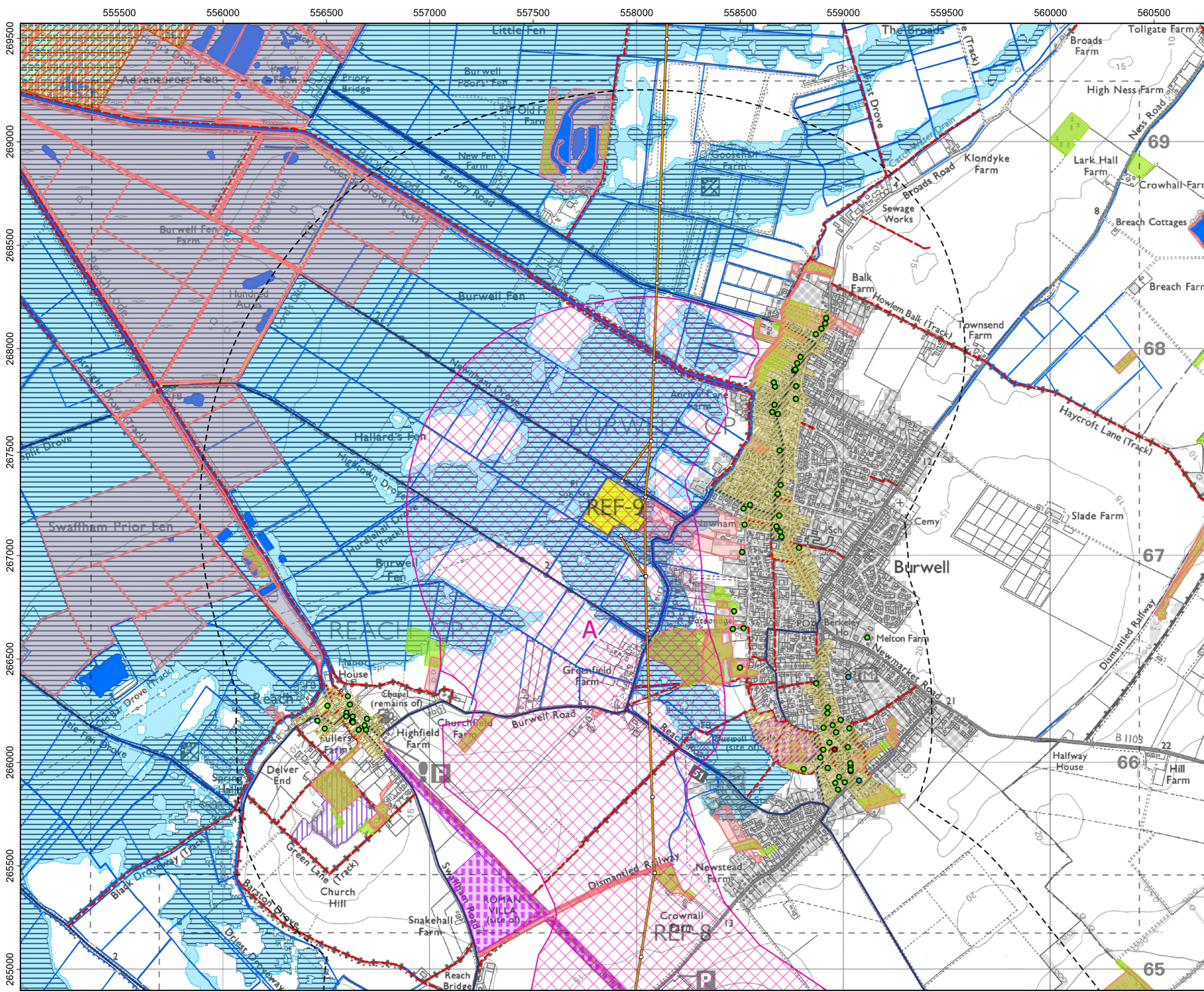
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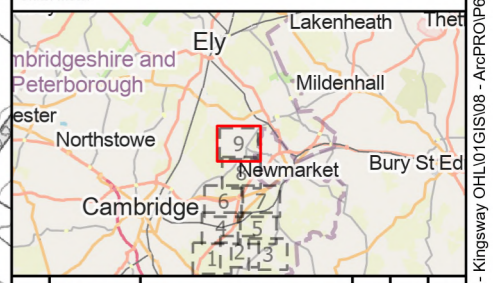
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REV 03



- Legend:**
- Reference Grid
 - Scheme Components**
 - Grid Connection Corridor A
 - 1km and 5km Component Boundary Buffers
 - Existing National Grid Infrastructure**
 - National Grid Substations
 - National Grid Towers
 - National Grid OHL (400kV)
 - Heritage**
 - Grade I Listed Building
 - Grade II Listed Building
 - Grade II* Listed Building
 - Conservation Areas
 - Scheduled Monuments
 - Ecology**
 - Ramsar
 - National Nature Reserves
 - Sites of Special Scientific Interest
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 - Landscape, Recreation and Population**
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663900 - Kingsway Solar Farm

TITLE: Appendix A-9:
 Environmental Features REF-9

ID: P663900_Constraints_Plan_A3L_REF

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REV 03

APPENDIX B: PROPOSED STRUCTURE OF THE ENVIRONMENTAL STATEMENT

Volume 1 – Introductory chapters

- Chapter 1: Background and Context
- Chapter 2: Location of the Scheme
- Chapter 3: Scheme Description
- Chapter 4: Reasonable Alternatives Considered
- Chapter 5: Approach to EIA

Volume 2 – Factor chapters

- Chapter 6: Biodiversity
- Chapter 7: Landscape and Visual Amenity
- Chapter 8: Cultural Heritage
- Chapter 9: Land, Soils and Groundwater
- Chapter 10: Air Quality
- Chapter 11: Noise and Vibration
- Chapter 12: Traffic and Transport
- Chapter 13: Population
- Chapter 14: Climate
- Chapter 15: Cumulative Effects

Volume 3 – Supporting Figures

Volume 4 – Supporting Technical Appendices (including Non-technical Summary and Commitments Register)

APPENDIX C: EIA SIGNIFICANCE CRITERIA

Biodiversity

The determination of ecologically significant effects for ecological impact assessment (EclA), as discussed below, is taken from ‘*Guidelines for Ecological Impact Assessment in the UK and Ireland*’ (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018 (Version 1.2 - updated April 2022))²⁰⁵.

This preliminary assessment comprises 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; and
- Provide a scientifically rigorous and transparent assessment of the likely ecological impacts and resultant effects. Impacts and effects may be positive or negative.

Criteria that will be 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.

The geographic frames of reference used for this assessment to help determine the ecological importance of receptors in accordance with the CIEEM Guidelines 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 (within approximately 5km of the Site boundary).

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.

²⁰⁵ Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) (Version 1.2 - updated April 2022). *Guidelines for Ecological Impact Assessment in the UK and Ireland – Terrestrial, Freshwater, Coastal and Marine*. Available online: <https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-2018-Terrestrial-Freshwater-Coastal-and-Marine-V1.2-April-22-Compressed.pdf>

When assigning ecological importance to species populations, the following will be 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.

When assigning ecological importance to plant communities, these will be assessed in terms of their intrinsic value, habitat for supporting protected species and for supporting plants species of nature conservation concern.

When describing ecological impacts and effects, reference is made to the following characteristics as required:

- **Positive or negative:** Positive represents a change that improves the quality of the environment e.g. by increasing species diversity, extending habitat or improving water quality. This may also include halting or slowing an existing decline in the quality of the environment. Negative represents a change which reduces the quality of the environment e.g. destruction of habitat, removal of foraging habitat, habitat fragmentation, pollution.
- **Extent:** The spatial or geographical area over which the impact/effect may occur under a suitably representative range of conditions (e.g. noise transmission under water).
- **Magnitude:** The size, amount, intensity and volume - this should be described on a quantitative basis where possible.
- **Duration:** Defined in relation to ecological characteristics (such as the lifecycle of a species) as well as human timeframes.
- **Frequency and timing:** The number of times an activity occurs.
- **Reversibility:** An irreversible effect is one from which recovery is not possible within a reasonable timescale or there is no reasonable chance of action being taken to reverse it. A reversible effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation. In some cases, the same activity can cause both reversible and irreversible effects.

CIEEM Guidelines require a clear statement as to whether or not an effect is significant and at what geographical scale, for example 'significant at the national level'. In accordance with CIEEM Guidelines a significant effect is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. A significant effect can be either positive or negative.

Landscape and visual amenity

In accordance with GLVIA3, 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 the Scheme.

Landscape and visual sensitivity

Sensitivity (described as ‘high’, ‘medium’ or ‘low’) is judged by combining component judgements about the value and susceptibility of the receptor, as illustrated in **Table C1** and **Table C2** below.

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. **Table C1** and **Table C2** below should not be interpreted rigidly to give a specific answer. Note that equal weighting is attributed to susceptibility and value when determining overall landscape sensitivity but that a greater weight is intentionally attributed to the susceptibility of the visual receptor than to value. This is in recognition of the fact that relatively few views are specifically recognised through designation or cultural reference but acknowledges that value associations may still influence visual sensitivity.

Table C1: Landscape sensitivity criteria

Value	Susceptibility		
	High	Medium	Low
National	High	High/medium	Medium
Regional	High/Medium	Medium	Medium/Low
Community	Medium	Medium/Low	Low

Table C2: 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

The magnitude of effect arising from the Scheme (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.

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.

The diagrams presented below in **Figure C1** illustrate in outline how these two modifying factors will be 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 **Figure C1** (Stage 1).

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 **Figure C1**. The outcome of Stage 2 is the overall magnitude of effect judgement reported in the assessment. **Figure C1** 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.

Figure C1: Combining scale of change, extent and duration to determine magnitude of landscape and visual effects

Stage 1 - Modifying Influence of Geographic Extent on Magnitude of Effect

		Scale of Change			
		Large	Medium	Small	Negligible
Geographic Extent	Wide	Substantial			
	Intermediate		Moderate		
	Localised			Slight	
	Limited				Negligible

Stage 2 - Modifying Influence of Duration on Magnitude of Effect

		Stage 1 Result			
		Substantial	Moderate	Slight	Negligible
Duration	Permanent	Substantial			
	Long-term		Moderate		
	Medium-term			Slight	
	Short-term				Negligible

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

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 C3**. **Table C3** is not used as a prescriptive tool and illustrates the typical outcomes, allowing for the exercise of professional judgement.

Table C3: Significance of effect criteria

Receptor Sensitivity	Magnitude of Change			
	Substantial	Moderate	Slight	Negligible
High	Major	Major / Moderate	Moderate	Minor
Medium	Major / Moderate	Moderate	Moderate / Minor	Minor / Negligible
Low	Moderate	Moderate / Minor	Minor	Negligible

Effects classified as ‘major’ or ‘major/moderate’ are considered to be significant.

Effects classified as ‘moderate/minor’, ‘minor’, ‘minor/negligible’ or ‘negligible’ significance are considered to be not significant.

Moderate effects lie somewhere in the middle of the range of effects identified. Within the meaning of this term in the assessment there is a spectrum of effects ranging from those tending towards a major/moderate effect (significant) to those tending towards a moderate/minor effect (not significant). ‘Moderate’ effects may therefore be either significant or not significant depending on where they fall on this spectrum. Where ‘moderate’ effects are predicted, professional judgement is applied to determine whether the effect is significant or not ensuring that the potential for significant effects to arise will be thoroughly considered and justification is provided for the judgement reached as appropriate. Clarification 3 (5) of Landscape Institute Technical Guidance Note LITGN-2024-01: Notes and Clarifications on Aspects of Guidelines for Landscape and Visual Impact Assessment Third edition recognises this as an appropriate approach to identifying significant effects in LVIA.

Nature of effects

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.

Changes to rural landscapes involving construction of utilitarian objects of a large scale are generally considered to be adverse. In this assessment it will be assumed that where new infrastructure is introduced into the landscape or views, this would generally constitute an adverse effect.

Residential visual amenity assessment

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 against other material considerations.

Landscape Institute Technical Guidance Note 02/19 (TGN 2/19) 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.”

Visual aids

Zone of Theoretical Visibility maps (ZTVs) will be generated using Geographical Information Systems (GIS) principally to assist in identifying areas where visibility of the Scheme would not occur. These also assist in viewpoint selection and to identify areas from where part or all of the Scheme may be visible.

The ZTVs are based on a number of variants to illustrate different levels of potential visibility: A standard screening ZTV takes account of buildings and significant blocks of woodland in the landscape; whilst a detailed screening ZTV uses LIDAR data to provide the most detailed review of visibility.

Cultural heritage

Importance of the receptor

The importance of a heritage asset is the overall value assigned to it reflecting its statutory designation or, in the case of non-designated assets, the professional judgement of the assessor with reference to national and local guidance and the planning policy tests (**Table C4**). Historic England’s Historic Environment Good Practice Advice in Planning GPA2, Managing Significance in Decision-Taking in the Historic Environment (2015)²⁰⁶ refers to an asset’s “*level of significance*”, which in this usage has the same meaning as importance.

²⁰⁶ Historic England (July 2015) Historic Environment Good Practice Advice in Planning GPA2, Managing Significance in Decision-Taking in the Historic Environment. Available online: [Managing Significance in Decision-Taking in the Historic Environment](#)

Table C4: Criteria for establishing importance of heritage assets

Importance of the Asset	Criteria
Very high (International)	World Heritage Sites; assets of acknowledged international importance; assets that can contribute significantly to acknowledged international research objectives; historic landscape of international value (designated or not) and extremely well-preserved historic landscapes with exceptional coherence, time depth or other critical factor(s).
High (National)	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; Protected Wreck Sites; Registered Battlefields; Grade I and II* Registered Historic Parks and Gardens. Conservation Areas containing very important buildings or with other 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 (National or Regional)	Grade II Listed Buildings, Grade II Registered Historic Parks and Gardens, non-designated assets that contribute to regional research objectives; Locally listed buildings (historic unlisted buildings) that have exceptional qualities; Conservation Areas.
Low (Local)	Non-designated historic assets of local importance including those compromised by poor preservation; assets of limited value but with the potential to contribute to local research objectives; locally listed buildings; robust non-designated historic landscapes.
Negligible	Assets with very little surviving archaeological interest; buildings of little architectural or historic note; landscapes with little significant historic interest. Negligible or no heritage significance.
Unknown	Further information is required to assess the potential of these sites

Magnitude of change (impact upon heritage significance)

Impacts may be described as permanent/temporary, and beneficial/adverse. Temporary impacts may be described as either short, medium or long term. For the purposes of this assessment, permanent impacts are those which are irreversible (e.g. physical impacts to archaeological remains; changes to the setting of heritage assets as a result of permanent elements of the Scheme such as the substation, road alterations, or planting), whilst temporary impacts are reversible (e.g. changes to the setting of heritage asset during the construction phase or as a result of elements of the Scheme that will be removed on decommissioning). Short term temporary impacts are those

that would occur for a duration of under 48 months (i.e. during construction or decommissioning), long term temporary impacts those that would occur while the Scheme is operational.

Determining magnitude using the criteria set out in **Table C5** below requires professional judgement with reference to the planning policy tests for “substantial harm” and “less than substantial harm”.

Table C5: Criteria for classifying magnitude of impact upon heritage significance

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 asset, such that its significance is slightly compromised.
Negligible	Very minor changes to historic building elements, archaeological materials or setting that hardly affect them/it.
No Change	No change to fabric, archaeological materials or setting.

Significance of effect

The assessment of the significance of effect in this chapter will combine analysis of the baseline data (e.g. desk-based assessment, site visit and ZTVs) with the parameters of the Scheme presented in the reasonable worst-case scenario (**Table C5**) above.

Significance of effect will be 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 C6** 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.

'Very large', 'large' and 'moderate' effects are regarded as 'significant' while 'slight' effects, and 'neutral' effects and 'no effects' are regarded as 'not significant'. Where the significance matrix indicates a range for the effect significance (e.g. 'slight or moderate'), professional judgement is applied to select the most applicable 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 C6: Criteria for assessing the significance of effect

Magnitude of impact	Importance of receptor				
	Negligible	Low	Medium	High	Very High
Major	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
Moderate	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
Minor	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
Negligible	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
None	No Effect	No Effect	No Effect	No Effect	No Effect

Land, soil and groundwater

Receptor sensitivity for land and soil

Sensitivity criteria for land and soil, derived from the IEMA (2022) Guide: A New Perspective on Land and Soil in Environmental Impact Assessment²⁰⁷, are defined in Table C7.

Table C7: Receptor sensitivity for land and soil

Sensitivity (in-situ soil)	Soil resource
Very High	<p>Biomass production: Agricultural Land Classification Grades 1 & 2.</p> <p>Ecological habitat, soil biodiversity and platform for landscape: Soils supporting protected features within a European site (e.g., Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar); Peat soils; Soils supporting a National Park, or Ancient Woodland.</p> <p>Soil carbon: Peat soils.</p> <p>Soils with potential for ecological/landscape restoration.</p>

²⁰⁷ Institute of Environmental Management & Assessment (IEMA) (2022) Guide: A New Perspective on Land and Soil in Environmental Impact Assessment.

Sensitivity (in-situ soil)	Soil resource
	<p>Soil hydrology: Very important catchment pathway* for water flows and flood risk management.</p> <p>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.</p> <p>Source of materials: Important surface mineral reserves that would be sterilised (i.e., without future access).</p>
High	<p>Biomass production: Agricultural Land Classification Grade 3a.</p> <p>Ecological habitat, soil biodiversity and platform for landscape: Soils supporting protected features within a UK designated site (e.g., UNESCO Geoparks, Site of Special Scientific Interest (SSSI) or Areas of Outstanding Natural Beauty (now Protected Landscapes), Special Landscape Area, and Geological Conservation Review sites); Native Forest and woodland soils; Unaltered soils supporting semi-natural vegetation (including UKBAP priority habitats).</p> <p>Soil carbon: Organo-mineral soils (e.g., peaty soils).</p> <p>Soil hydrology: Important catchment pathway* for water flows and flood risk management.</p> <p>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; Regionally Important Geological and Geomorphological Sites; Soils supporting community/recreational/educational access to Regionally Important Geological and Geomorphological Sites and Areas of Outstanding Natural Beauty (now Protected Landscapes).</p> <p>Source of materials: Surface mineral reserves that would be sterilised (i.e. without future access).</p>
Medium	<p>Biomass production: Agricultural Land Classification Grade 3b.</p> <p>Ecological habitat, soil biodiversity and platform for landscape: Soils supporting protected or valued features within non-statutory designated sites (e.g., Local Nature Reserves (LNRs), Local Geological Sites (LGSs), Sites of Nature Conservation Importance (SNCIs), Special Landscape Areas; Non-Native Forest and woodland soils.</p> <p>Soil carbon: Mineral soils.</p> <p>Soil hydrology: Important minor catchment pathway* for water flows and flood risk management.</p> <p>Archaeology, Cultural heritage, community benefits and geodiversity: Soils with possible but as yet unproven (prior to being</p>

Sensitivity (in-situ soil)	Soil resource
	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: Agricultural Land Classification Grades 4 & 5. 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. 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.
* As defined by the site and catchment characteristics according to the professional judgement of a catchment hydrologist.	

Receptor importance for groundwater

The importance criteria presented in **Table C8** are derived from the Design Manual for Roads and Bridges LA 113: Road Drainage and the Water Environment²⁰⁸.

Table C8: Receptor importance for groundwater

Importance	Typical criteria	Typical examples
Very High	Nationally significant attribute of high importance	Principal aquifer providing a regionally important resource, and/or supporting a site protected under EC and UK legislation; Groundwater that locally supports a Groundwater dependent terrestrial ecosystem; Source Protection Zone 1
High	Locally significant	Principal aquifer providing locally important resource or supporting a river ecosystem;

²⁰⁸ Design Manual for Roads and Bridges (March 2020) Sustainability & Environment Appraisal LA 113 Road drainage and the water environment.

Importance	Typical criteria	Typical examples
	attribute of high importance	Groundwater that supports a Groundwater dependent terrestrial ecosystem; Source Protection Zone 2.
Medium	Of moderate quality and rarity	Aquifer providing water for agriculture or industrial use with limited connection to surface water; Source Protection Zone 3.
Low	Lower quality	Unproductive strata

Magnitude of impact (change) for land and soil

The magnitude of impact (change) is classified using the criteria presented in **Table C9**, which are derived from the IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment.

Table C9: Magnitude of impact (change) criteria for land and soil

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 hectares or loss of soil-related features (as set out in Table 2 of the IEMA guidance), 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 hectares, or gain in soil-related features (as set out in Table 2 of the IEMA guidance), 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 hectares and 20 hectares or loss of soil-related features (as set out in Table 2 of the IEMA guidance), 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 hectares and 20 hectares, or gain in soil-related features (as set out in Table 2 of the IEMA guidance), as advised by other factor specialists in EIA team.

Magnitude of impact (change)	Description of impacts restricting proposed land use
Minor	Permanent, irreversible loss over less than 5 hectares or a temporary, reversible loss of one or more soil functions or soil volumes, or temporary, reversible loss of soil-related features (as set out in Table 2 of the IEMA guidance), 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 hectares 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 set out in Table 2 of the IEMA guidance), 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.
<p># The IEMA Guide has what is assumed to be an error in this cell, but reference to Table 5 of the IEMA Guide confirms that the magnitude should be shown as Major, which is presented here, instead of reproducing the perceived IEMA error</p> <p>* Temporary developments can result in a permanent impact if resulting disturbance or land use change causes permanent damage to soils.</p>	

Magnitude of impact for groundwater

The magnitude of impact has been classified using the criteria presented in **Table C10** below, which are adapted from Design Manual for Roads and Bridges LA 113: Road Drainage and the Water Environment.

Table C10: Magnitude of impact criteria for groundwater

Magnitude of impact	Criteria	Typical example
Major adverse	Results in loss of attribute and/or quality and integrity of the attribute.	<p>Loss of, or extensive change to, an aquifer.</p> <p>Loss of regionally important water supply.</p> <p>Potential high risk of pollution to groundwater from routine runoff.</p> <p>Loss of, or extensive change to groundwater dependent terrestrial ecosystem or baseflow contribution to protected surface water bodies.</p>

Magnitude of impact	Criteria	Typical example
		Reduction in water body Water Framework Directive classification. Loss or significant damage to major structures through subsidence or similar effects.
Moderate adverse	Results in effect on integrity of attribute, or loss of part of attribute	<p>Partial loss or change to an aquifer.</p> <p>Degradation of regionally important public water supply or loss of significant commercial/ industrial/ agricultural supplies.</p> <p>Potential medium risk of pollution to groundwater from routine runoff.</p> <p>Partial loss of the integrity of groundwater dependent terrestrial ecosystem.</p> <p>Contribution to reduction in water body Water Framework Directive classification.</p> <p>Damage to major structures through subsidence or similar effects or loss of minor structures.</p>
Minor adverse	Results in some measurable change in attributes, quality or vulnerability	<p>Potential low risk of pollution to groundwater from routine runoff.</p> <p>Minor effects on an aquifer, groundwater dependent terrestrial ecosystems, abstractions and structures.</p>
Negligible	Results in effect on attribute, but of insufficient magnitude to affect the use or integrity	No measurable impact upon an aquifer and/or groundwater receptors.
Minor beneficial	Results in some beneficial effect on attribute or a reduced risk of	<p>Reduction of groundwater hazards to existing structures.</p> <p>Reductions in waterlogging and groundwater flooding.</p>

Magnitude of impact	Criteria	Typical example
	negative effect occurring	
Moderate beneficial	Results in moderate improvement of attribute quality	Contribution to improvement in water body Water Framework Directive classification. Improvement in water body catchment abstraction management Strategy (or equivalent) classification. Support to significant improvements in damaged groundwater dependent terrestrial ecosystem.
Major beneficial	Results in major improvement of attribute quality	Removal of existing polluting discharge to an aquifer or removing the likelihood of polluting discharges occurring. Recharge of an aquifer. Improvement in water body Water Framework Directive classification.
No change		No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Significance of effect for land and soil

The significance of effect for land and soil is based on the sensitivity of the receptor and the magnitude of impact (change), as outlined in **Table C11** and derived from the IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment. The significance of effect can be adverse or beneficial.

The significance of an effect is reported as either 'significant' or 'not significant'. Any effects determined as 'moderate' or above are considered to be significant. Any effects determined as 'slight' 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 be justified by evidence, as appropriate), or an effect significance range can be applied. Where a range for the effect of significance means that the effect could be either significant or not significant, professional judgement has been applied to define the significance (for example with the range 'slight to moderate', where slight would be not significant, but moderate would be significant). Where both categories within the range fall within either 'significant' or 'not significant', the range has not been adjusted to a

single descriptor (for example if the range is ‘neutral or slight’, as both effects are considered to be not significant; or if the range is ‘large or very large’, as both effects are considered to be significant).

Table C11: Significance of effect criteria for land and soil

Sensitivity	Magnitude of impact (change)				
	No Change	Negligible	Minor	Moderate	Major
Negligible	Neutral	Neutral or Slight*	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	Moderate or Large	Large or Very Large	Very Large

** This cell is listed as ‘Slight’ in the IEMA Guide, but has been adjusted to ‘Neutral or Slight’ to be consistent with the ranking scheme (the significance of effect should be equal to or lower than the adjacent cell to the right, not higher)*

Significance of effect for groundwater

The significance of effect for groundwater relating to potential contamination is based on the importance of the receptor and the magnitude of impact, as outlined in **Table C12** below and adapted from Design Manual for Roads and Bridges LA 104: Environmental Assessment and Monitoring²⁰⁹. The significance of effect can be adverse or beneficial.

The significance of an effect is reported as either ‘significant’ or ‘not significant’. Any effects determined as ‘moderate’ or above are considered to be significant. Any effects determined as ‘slight’ 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 be justified by evidence, as appropriate), or an effect significance range can be applied. Where a range for the effect of significance means that the effect could be either significant or not significant, professional judgement has been applied to define the significance (for example with the range ‘slight to moderate’, where slight would be not significant, but moderate would be significant). Where both categories within the range fall within either ‘significant’ or ‘not significant’, the range has not been adjusted to a single descriptor (for example if the range is ‘neutral or slight’, as both effects are

²⁰⁹ Design Manual for Roads and Bridges (August 2020) Sustainability & Environment Appraisal LA 104 Environmental assessment and monitoring.

considered to be not significant; or if the range is ‘large or very large’, as both effects are considered to be significant).

Table C12: Significance of effect criteria for groundwater

Importance	Magnitude of impact				
	No change	Negligible	Minor	Moderate	Major
Very high	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
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

Air Quality

The significance level attributed to each effect will be assessed based on the magnitude of change due to the Scheme and the sensitivity of the affected areas.

Construction and decommissioning phases: dust and particulate matter emissions impacts

The Institute of Air Quality Management (IAQM) ‘*Guidance on the assessment of dust from demolition and construction V2.2*’ (2024)²¹⁰ criteria and methodology will be adopted to determine the sensitivity of the area and the magnitude of change.

Three separate potential dust impacts will be considered:

- Annoyance due to dust soiling;
- The risk of health effects due to an increase in exposure to Particulate Matter with a diameter of 10 microns or less (PM₁₀); and
- Harm to ecological receptors.

Sensitivity of the area

The sensitivity of the area takes into account a number of factors, comprising:

- The specific sensitivities of receptors in the area;
- The proximity and number of those receptors;
- In the case of PM₁₀, the local background concentration; and

²¹⁰ Institute of Air Quality Management (IAQM) *Guidance of the Assessment of Dust from Demolition and Construction (Version 2.2)*. Available online at: <https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf>

- Site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Tables C13, C14 and C15 set out the general principles as set out in IAQM ‘Guidance on the assessment of dust from demolition and construction V2.2’ (2024), along with professional judgement, that will be considered to determine the scale of sensitivity that will be applied to areas identified and considered within the construction and decommissioning phases assessments.

Table C13: Construction and decommissioning phases assessments – sensitivity of the area to dust soiling effects on people and property

Receptor sensitivity	Number of receptors	Distance from the source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Notes²¹¹:
 The sensitivity of the area should be derived for each of the four activities: demolition, construction, earthworks and trackout.
 Estimate the total number of receptors within the stated distance. Only the highest level of area sensitivity from the table needs to be considered. For example, if there are 7 high sensitivity receptors <20 m of the source and 95 high sensitivity receptors between 20 and 50 m, then the total of number of receptors <50 m is 102. The sensitivity of the area in this case would be high.
 For trackout, the distances should be measured from the side of the roads used by construction traffic. The impact declines with distance from the site, and it is only necessary to consider trackout impacts up to 50 m from the edge of the road.

Table C14: Construction and decommissioning phases assessments – sensitivity of the area to human health impacts

Receptor sensitivity	Annual mean PM ₁₀ concentration	Number of receptors	Distance from the source (m)			
			<20	<50	<100	<250
High	>32 µg/m ³	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28-32 µg/m ³	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low

²¹¹ Notes are derived from Institute of Air Quality Management Guidance of the Assessment of Dust from Demolition and Construction v2.2 and explain how the sensitivity of the area to dust soiling effects on people and property is determined.

Receptor sensitivity	Annual mean PM ₁₀ concentration	Number of receptors	Distance from the source (m)				
			<20	<50	<100	<250	
	24-28 µg/m ³	1-10	High	Medium	Low	Low	
		>100	High	Medium	Low	Low	
		10-100	High	Medium	Low	Low	
	<24 µg/m ³	1-10	Medium	Low	Low	Low	
		>100	Medium	Low	Low	Low	
		10-100	Low	Low	Low	Low	
	Medium	>32 µg/m ³	1-10	Low	Low	Low	Low
			>100	High	Medium	Low	Low
			10-100	Medium	Low	Low	Low
28-32 µg/m ³		1-10	Medium	Low	Low	Low	
		>100	Low	Low	Low	Low	
		10-100	Low	Low	Low	Low	
24-28 µg/m ³		1-10	Low	Low	Low	Low	
		>100	Low	Low	Low	Low	
		10-100	Low	Low	Low	Low	
<24 µg/m ³		1-10	Low	Low	Low	Low	
		>100	Low	Low	Low	Low	
		10-100	Low	Low	Low	Low	
Low	-	≥1	Low	Low	Low	Low	

Notes²¹²:

The sensitivity of the area should be derived for each of the four activities: demolition, construction, earthworks and trackout.

Estimate the total within the stated distance (e.g. the total within 250 m and not the number between 100 and 250 m), noting that only the highest level of area sensitivity from the table needs to be considered. For example, if there are 7 high sensitivity receptors <20 m of the source and 95 high sensitivity receptors between 20 and 50 m, then the total of number of receptors <50 m is 102. If the annual mean PM10 concentration is 29 µg/m³, the sensitivity of the area would be high.

Most straightforwardly taken from the national background maps, but should also take account of local sources. The values are based on 32 µg/m³ being the annual mean concentration at which an exceedence of the 24-hour objective is likely in England, Wales and Northern Ireland. In Scotland there is an annual mean objective of 18 µg/m³.

In the case of high sensitivity receptors with high occupancy (such as schools or hospitals) approximate the number of people likely to be present. In the case of residential dwellings, just include the number of properties.

²¹² Notes are derived from Institute of Air Quality Management Guidance of the Assessment of Dust from Demolition and Construction v2.2 and explain how the sensitivity of the area to human health impacts is determined.

Receptor sensitivity	Annual mean PM ₁₀ concentration	Number of receptors	Distance from the source (m)			
			<20	<50	<100	<250
<p><i>For trackout, the distances should be measured from the side of the roads used by construction traffic. The impact declines with distance from the site, and it is only necessary to consider trackout impacts up to 50 m from the edge of the road.</i></p>						

Table C15: Construction and decommissioning phases assessments – sensitivity of the area to ecological impacts

Receptor sensitivity	Distance from the source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low
<p><i>Notes²¹³: The sensitivity of the area should be derived for each of the four activities: demolition, construction, earthworks and trackout and for each designated site. Only the highest level of area sensitivity from the table needs to be considered. For trackout, the distances should be measured from the side of the roads used by construction traffic. The impact declines with distance from the site.</i></p>		

Dust emission magnitude

Table C16 presents the potential magnitude of change for dust emissions that will be used in undertaking the construction and decommissioning phases assessments. The descriptors included in this table are based upon the IAQM ‘Guidance on the assessment of dust from demolition and construction, V2.2’ (2024).

Table C16: Construction and decommissioning phases assessments – scale of magnitude for dust emission impacts

Activity	Dust emissions magnitude	Description
Demolition	Large	Total building volume >75,000 m ³ , potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >12 m above ground level.
	Medium	Total building volume 12,000 m ³ – 75,000 m ³ , potentially dusty construction material,

²¹³ Notes are derived from Institute of Air Quality Management Guidance of the Assessment of Dust from Demolition and Construction v2.2 and explain how the sensitivity of the area to ecological impacts is determined.

Activity	Dust emissions magnitude	Description
		demolition activities 6-12 m above ground level.
	Small	Total building volume <12,000 m ³ , construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <6 m above ground, demolition during wetter months.
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 m ² – 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 – 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), on site concrete batching.
	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 Heavy Duty Vehicle (>3.5 t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m.
	Medium	20 – 50 Heavy Duty Vehicle (>3.5 t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m.
	Small	<20 Heavy Duty Vehicle (>3.5 t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m.

Significance of effect

The sensitivity of area and magnitude of change will then be combined using the significance matrix as detailed in **Table C17** below to determine the potential risks from dust emissions from unmitigated demolition, earthworks, construction and trackout activities, which will be used to recommend site-specific mitigation measures. The classification of risk is based upon the IAQM ‘Guidance on the assessment of dust from demolition and construction, V2.2’ (2024)²¹⁴.

The determination of the risk category determines the level of mitigation that must be applied. For those cases where the risk category is ‘negligible’, no mitigation measures beyond those required by legislation will be required.

The Institute of Air Quality Management Guidance of the Assessment of Dust from Demolition and Construction v2.2 makes reference to the use of professional judgement when assessing the significance of the effects of dust impacts from construction and decommissioning activities. ‘High risk’ is considered to be **significant** and ‘medium risk’, ‘low risk’ and ‘negligible’ are considered to be **not significant**.

Table C17: Construction and decommissioning phases assessments – level of effects for dust emission impacts

Activity	Sensitivity of the area	Dust emission magnitude		
		Large	Medium	Small
Demolition	High	High risk	Medium risk	Medium risk
	Medium	High risk	Medium risk	Low risk
	Low	Medium risk	Low risk	Negligible
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

²¹⁴ Institute of Air Quality Management (2024) Guidance on the assessment of dust from demolition and construction, V2.2. Available online: <https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf>

Construction and decommissioning phases: exhaust emissions

Exhaust emissions from construction and decommissioning plant may have an impact on local air quality in the vicinity of the Site. A qualitative impact assessment will be undertaken with reference to the Greater London Authority Non-Road Mobile Machinery Practical Guide²¹⁵, and based on professional judgement and considering the following factors:

- The duration of the construction/decommissioning phase;
- The number and type of construction/decommissioning plant that could be required; and
- The number and proximity of sensitivity receptors to the Site.

Road traffic exhaust emissions during construction, operation (including maintenance) and decommissioning phases

Construction and decommissioning traffic will 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 will be in areas adjacent to the Site access and nearby road network. A screening level qualitative assessment for construction and decommissioning road traffic exhaust emissions will be undertaken with reference to the Environmental Protection UK and Institute of Air Quality Management 2017 guidance²¹⁶ and Design Manual for Roads and Bridges LA 105 Air Quality²¹⁷, using professional judgement and by considering the following information:

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

A screening level qualitative assessment for operational road traffic exhaust emissions will be undertaken to confirm the predicted operational traffic movements fall below the Environmental Protection UK and Institute of Air Quality Management 2017

²¹⁵ Greater London Authority (April 2022) Non-Road Mobile Machinery (NRMM) Practical Guide v.5. Available online: https://www.london.gov.uk/sites/default/files/nrmm_practical_guide_april_2022_web.pdf

²¹⁶ Environmental Protection United Kingdom and Institute of Air Quality Management Land-Use Planning and Development Control: Planning for Air Quality. Available online: <https://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf>

²¹⁷ Highways England (November 2019) Design Manual for Roads and Bridges: Sustainability & Environment Appraisal LA 105 Air quality. [Online – withdrawn] Available at: <https://www.standardsforhighways.co.uk/tses/attachments/10191621-07df-44a3-892e-c1d5c7a28d90?inline=true>

guidance and Design Manual for Roads and Bridges LA 105 Air Quality screening criteria.

Sensitivity of the receptor

Matrices for determining the sensitivity of the receptor are not available in Environmental Protection UK and Institute of Air Quality Management 2017 guidance or Design Manual for Roads and Bridges LA 105 Air Quality, and therefore matrices from Institute of Air Quality Management Guidance of the Assessment of Dust from Demolition and Construction v2.2 as shown in **Table C18** will be used.

Table C18: Scale of receptor sensitivity

Sensitivity of receptor	Human receptors	Ecological receptors
High	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 should also be considered as having equal sensitivity to residential areas for the purposes of this 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 published by Joint Nature Conservation Committee. 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	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 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	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 may be affected by dust deposition. Example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.

Sensitivity of receptor	Human receptors	Ecological receptors
	PM ₁₀ , as protection is covered by health and safety at work legislation.	
Low	Locations where human exposure is transient. Examples include public footpaths, playing fields, parks and shopping streets.	Locations with a local designation where the features may be affected by dust deposition. Example is a Local Nature Reserve (LNR) with dust sensitive features.

Magnitude of change

The significance of effects of exhaust emissions arising from vehicles during construction and decommissioning will be evaluated qualitatively using professional judgement and the principles of the EPUK-IAQM 'Land-Use Planning & Development Control: Planning for Air Quality' (2017)²¹⁸ and Design Manual for Roads and Bridges LA 105 Air Quality significance criteria. **Table C19** presents the EPUK-IAQM guidance and Design Manual for Roads and Bridges LA 105 Air Quality screening criteria for when an air quality assessment might be required. If none of the criteria are exceeded, it is considered unlikely that there will be any significant effects on air quality.

Table C19: Screening criteria for requiring an air quality assessment

Air quality screening criteria from EPUK-IAQM 2017 guidance	
The development will	Indicative criteria to proceed to an air quality assessment
Cause a significant change in Light Duty Vehicle traffic flows on local roads with relevant receptors	A change of Light Duty Vehicle flows of: -more than 100 Annual Average Daily Traffic within or adjacent to an Air Quality Management Area -more than 500 Annual Average Daily Traffic elsewhere.
Cause a significant change in Heavy Duty Vehicle flows on local roads with relevant receptors	A Change of Heavy Duty Vehicle flows of: -more than 25 Annual Average Daily Traffic within or adjacent to an Air Quality Management Area -more than 100 Annual Average Daily Traffic elsewhere.
Air quality screening criteria from Design Manual for Roads and Bridges LA 105 Air Quality	

²¹⁸ Environmental Protection United Kingdom and Institute of Air Quality Management Land-Use Planning and Development Control: Planning for Air Quality. Available online: <https://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf>

-Daily traffic flow changes of 1,000 Annual Average Daily Traffic or more; or
 -Heavy Duty Vehicle flow changes of 200 or more.
 *Internationally, nationally and locally designated sites of ecological conservation importance on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity (known as designated habitats²¹⁹) within 200m of the affected road network shall be included in the air quality assessment.

Significance of effect

The Environmental Protection UK and Institute of Air Quality Management 2017 guidance and Design Manual for Roads and Bridges LA 105 Air Quality make reference to the use of professional judgement when assessing the significance of the effects of road traffic exhaust emissions during construction and decommissioning phases.

The Environmental Protection UK and Institute of Air Quality Management 2017 guidance recommends that the following factors should be taken into account when making judgement on the overall significance of effect of a development:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

Noise and Vibration

Construction noise

The method for assessing the significance of noise from construction activities are provided within Annex E of BS 5228-1²²⁰. One such method of applying significance to noise effects is repeated below in **Table C20**.

Table C20: Criteria for assessing potential significant effects (construction noise)

Assessment Category and Threshold Value Period, L _{Aeq}	Threshold Value in Decibels, dB		
	Category A ^[1]	Category B ^[2]	Category C ^[3]
Night-time (23:00-07:00)	45	50	55
Evenings and weekends ^[4]	55	60	65

²¹⁹ Designated habitats include 'Ramsar' sites, special protection areas, special areas of conservation, sites of special scientific interest, local nature reserves, local wildlife sites, nature improvement areas, ancient woodland and veteran trees.

²²⁰ British Standards Institution (2014), 'British Standard 5228-1: 2009+A1: 2014, Code of practice for noise and vibration control on construction and open sites – Noise'.

Assessment Category and Threshold Value Period, L_{Aeq}	Threshold Value in Decibels, dB		
	Category A ^[1]	Category B ^[2]	Category C ^[3]
Daytime (07:00-19:00) and Saturdays (07:00-13:00)	65	70	75
<p>^[1] Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.</p> <p>^[2] Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.</p> <p>^[3] Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.</p> <p>^[4] 19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00–23.00 Sundays.</p>			

A significant effect has been deemed to occur if the site noise level (construction only), exceeds the threshold level for the Category appropriate to the ambient noise level for a month or more. If the baseline ambient noise level exceeds the Category C values, then a significant effect is deemed to occur if the total noise level (construction + ambient noise) for the period increases by more than 3 dB.

Works for a shorter duration that might result in a significant effect are considered by using the trigger levels for sound insulation and time criteria from Annex E.4 of BS 5228-1.

Construction vibration

BS 5228-2:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites. Vibration' (BS 5228-2)²²¹ provides guidance on vibration levels that can be used to assess the likely impacts of construction activities on buildings and on humans. Annex B of the standard gives guidance on the significance of vibration effects in terms of human response to vibration and structural response, replicated below in **Table C21**.

Table C21: Guidance on effects of vibration levels perceptible by humans

Vibration Level (PPV)	Effect
0.14 mms^{-1}	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration

²²¹ British Standards Institution (2014), British Standard 5228-2: 2009+A1: 2014, Code of practice for noise and vibration control on construction and open sites – Vibration.

Vibration Level (PPV)	Effect
0.3 mms ⁻¹	Vibration might be just perceptible in residential environments
1.0 mms ⁻¹	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents
10 mms ⁻¹	Vibration is likely to be intolerable for any more than a very brief exposure to this level

Table C22: Transient vibration guide values for cosmetic damage

Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures/industrial and heavy commercial buildings	50 mms ⁻¹ at 4 Hz and above	
Residential or light commercial buildings	15 mms ⁻¹ at 4 Hz increasing to 20 mms ⁻¹ at 15 Hz	20 mms ⁻¹ at 15 Hz increasing to 50 mms ⁻¹ at 40 Hz and above
Unreinforced or light framed structures		
[Note 1] Values referred to are at the base of the building.		
[Note 2] For lines 2 and 3, at frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded.		

BS 5228-2 states that the guide values for cosmetic damage predominantly relate to transient vibration which does not give rise to resonant responses in structures, and to low-rise buildings. Where the dynamic loading caused by continuous vibration is such as to give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in might need to be reduced by up to 50%.

Road traffic noise

The assessment is based on the procedure set out in Design Manual for Roads and Bridges (DMRB). The assessment covers both the magnitude and significance of any change as a result of any new or amended highway scheme however is relevant for noise assessment of other project types. DMRB refers specifically to noise impacts and as such will be discussed in these terms for the purposes of this assessment.

The magnitude of noise impact is therefore assessed by comparing the increase and decrease in noise levels between both short term and long-term scenarios. DMRB

defines this impact both in the short term (immediate impact) and long term (future impact), as defined below in **Table C23**.

Table C23: DMRB magnitude of noise impact criteria

Magnitude of Change	Noise Change, dB $L_{A10,18hr}$	
	Short Term	Long Term
Major	≥ 5.0	≥ 1.0
Moderate	3.0 to 4.9	5.0 to 9.9
Minor	1.0 to 2.9	3.0 to 4.9
Negligible	< 1.0	< 3.0

Operational noise

British Standard 4142:2014+A1:2019 '*Methods for rating and assessing industrial and commercial sound*'²²² describes the methods for rating and assessing noise from industrial or commercial sources, including manufacturing processes, fixed installations and plant equipment, loading of goods and sound from mobile plant. The standard is applicable for the purpose of assessing sound at dwellings, through the determination of a rating level of an industrial or commercial noise source.

Where certain acoustic features are present at the assessment location, a character correction can be applied to the specific sound level to give the rating level to be used in the assessment. This is compared to the pre-development background sound level to provide an initial indication of likely adverse effects from the Scheme, adopting the following framework:

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of adverse impact depending on the context.
- Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact depending on the context.

Where the initial estimate of the impact needs to be modified due to the context, all pertinent factors should be taken into account, including (but not limited to):

- The absolute sound level;
- The character and level of the residual sound;
- The sensitivity of the receptor and whether dwellings will already (or likely) to incorporate design measures that secure good internal and/or outdoor acoustic

²²² British Standards Institution (2019), 'British Standard 4142: 2014+A1: 2019, Methods for rating and assessing industrial and commercial sound'.

conditions, such as: i) façade insulation treatments, ii) ventilation and/or cooling, and iii) acoustic screening.

Assessment criteria

It is not possible to have a single objective noise-based measure that defines significance of effect that is applicable to all sources of noise and at all receptors. Consequently, appropriate assessment criteria used to establish significance of effect from the Scheme at each receptor will be developed based on the above standards and guidance, as informed by the study of baseline conditions.

Traffic and Transport

The Institute of Environmental Management and Assessment (IEMA) Environmental Assessment of Traffic and Movement (2023)²²³ will be used to characterise the environmental traffic and movement effects (off-site effects) and the assessment of significance. The guidelines intend to complement professional judgement and the experience of trained assessors.

The levels of sensitivity for the assessment of receptors related to traffic and transport impacts are defined within **Table C24** and based upon reasonable application of professional judgement and experience.

Table C24: Sensitivity of a receptor

Sensitivity level	Definition
Very High	The receptor has no ability to absorb change without fundamentally altering its present character or is of national or international importance.
High	The receptor has little ability to absorb change without fundamentally altering its present character or is of national or international importance.
Medium	The receptor has moderate capacity to absorb change without significantly altering its present characteristics.
Low	The receptor is tolerant of change without detriment to its present characteristics.
Negligible	The receptor can fully absorb change without any change to its present character.

It is necessary to identify user groups ('receptors') and associated locations ('links'), which may be sensitive to changes in the traffic and transport network conditions. A sensitive area may be where pedestrian activity is high, for example.

²²³ Institute of Environmental Management and Assessment (IEMA) (2023) Environmental Assessment of Traffic and Movement.

In terms of traffic and movement impacts, the receptors are the users of the roads, footpaths and PRowS within the study area and the locations through which those roads pass.

The sensitivity of receptors has been interpreted as detailed in **Table C25**.

The IEMA guidance identifies the key impacts that are most important when assessing the magnitude of traffic impacts from an individual development. The guidance on magnitude of impact has been interpreted as set out in **Table C26**.

Table C25: Classification of receptor sensitivity

Affected Party (Sensitive Receptor)	Sub-list	Built Environment Indicator on Link	Link Sensitivity
Non-motorised Users PRoW Users Motorists and Freight Vehicles Public Transport	People at home	Residential Properties	Negligible: No properties with direct frontage Low: Few properties with direct highway frontage on construction traffic routes. Medium: A number of properties with direct highway frontage on construction traffic routes High: A large number of properties with direct frontage
All	People at work	Employment uses (Offices, Industrial Units etc)	Negligible/Low: Not adversely impacted when at work
Non-motorised Users PRoW Users Motorists and Freight Vehicles Public Transport	Sensitive groups (Disabled, elderly, children)	Disabled parking bays, retirement/care centres, playgrounds/centres and schools	Negligible: No indication of sensitive groups present Low: c.1 indicator of sensitive groups present, with direct highway frontage Medium: Low number of sensitive groups present, with direct highway frontage High: Multiple indicators of sensitive groups present, with direct highway frontage
Non-motorised Users PRoW Users Motorists and Freight Vehicles Public Transport Emergency Services	Sensitive Locations	Hospitals, schools, historic buildings, places of worship	Negligible: No indication of sensitive groups present Low: c.1 indicator of sensitive groups present, with direct highway frontage Medium: Low number of sensitive groups present, with direct highway frontage High: Multiple indicators of sensitive groups present, with direct highway frontage
Non-motorised Users PRoW Users	Users walking	Crossing points, PRoWs, Footways	Negligible: No indication of sensitive groups present Low: c.1 indicator of sensitive groups present Medium: Medium use by receptor group – footways present High: High receptor use with no footways
Non-motorised Users PRoW Users	Users cycling/scooting	On/off-road routes, designated routes or infrastructure	Negligible: No indication of sensitive groups present Low: c.1 indicator of sensitive groups present e.g. off-road cycle route Medium: On-road cycle route present with segregation High: On-road cycle route present with no segregation
Non-motorised Users PRoW Users	Recreational areas/Open spaces	Parks, playgrounds/areas, shopping and community centres	Negligible: No indication of sensitive groups present (unlikely usage) Low: c.1 indicator of sensitive groups present Medium: Low number of sensitive groups present

Affected Party (Sensitive Receptor)	Sub-list	Built Environment Indicator on Link	Link Sensitivity
			High: Multiple indicators of sensitive groups present e.g. children present
Motorists and Freight Vehicles Public Transport Emergency Services	Road users	Road links/junctions, baseline traffic volume, existing signage/infrastructure	Presence of affected parties outlined in this table determine the sensitivity

Table C26: Classification of magnitude of impact

Transport & Movement Matter	Effect calculation method	Magnitude of change			
		High	Medium	Low	Negligible
Severance of Communities	% change in total traffic from baseline to baseline with Scheme flows	Changes in total traffic or HGV flows over 90%	Changes in total traffic or HGV flows of 60-90%	Changes in total traffic or HGV flows of 30-60%	Changes in total traffic or HGV flows of 0-30%
Road Vehicle Driver Delay & Passenger Delay	Delay to be determined using PICADY and the modelling outputs presented within the TA. Exact thresholds TBC.	High increase in queuing at junctions and/or congestion on road links. .	Medium increase in queuing at junctions and/or congestion on road links	Low increase in queuing at junctions and/or congestion on road links.	Low or no increase in queuing at junctions and/or congestion on road links.
Non-Motorised User Delay	Based on general level of pedestrian activity, visibility and physical conditions such as traffic flow, traffic composition, crossing points and pavement width/separation from traffic. No set thresholds so usually based on the T&M's expert professional judgment. In the absence of set thresholds, pedestrian delay can be calculated by determining when the traffic on the network surrounding the development is already at, or close to, capacity. An increase in total traffic of approximately 30% can double the delay experienced by pedestrians attempting to cross the road and would be considered major.				
Non-Motorised User Amenity	Where the traffic flow (or HGV component) is halved or doubled. The assessment of amenity should also take into account specific local conditions.				
Fear and intimidation	Calculate the degree of hazard score based on the sum of: - average traffic flow over 18-hour day (all vehicles/hour two-way) - total 18-hour HGV flow - average vehicle speeds				
Road User & Pedestrian Safety	Carry out a collision cluster assessment. Follow SafeSystem assessment approaches: - identify the study area using historic crash data - undertake evidence-led, objective modelling techniques to establish a baseline road safety level for the roads within the study area. This analysis can be carried out using iRAP Star rating protocols - Assess the effects of additional development traffic for all users (including vulnerable groups) across the whole width of the highway corridor. This model should also assess the effect of any changes to the baseline road network, such as the provision of access junction - An RSA can also be carried out				
Hazardous / Large Loads	Outline the estimated number and composition of hazardous loads. Determine the level of fear and intimidation based on the degree of hazard score and compare it to the baseline level. Magnitude of impact is based on change in step/traffic flows (AADT) from baseline conditions	Two step changes in level	One step change in level but with: - >400 veh increase in average 18 hr AV two-way all vehicle flow; and/or - >500 HV increase in total 18-hr HV flow	One step change in level with: - <400 veh increase in average 18 hr AV two-way vehicle flow; and/or - <500 HV	No change in step changes

Transport & Movement Matter	Effect calculation method	Magnitude of change			
		High	Medium	Low	Negligible
				increase in total 18 hr HV flow	

The criteria to determine the significance of effects is presented in **Table C27** below.

The significance of the effect upon identified receptors is determined by combining the assessed magnitude of impact and the sensitivity of the receptor.

The IEMA Guidelines establish thresholds in respect to changes in the volumes and composition of traffic to facilitate a subjective judgment of traffic impacts and significance. However, the IEMA Guidelines note that there is no clear definition of a significant effect in the EIA Regulations:

“For many effects, there are no simple rules or formulae that define appropriate assessment thresholds and therefore there is a need for interpretation and judgement on the part of the competent traffic and movement expert, backed up by data or quantified information where possible [...]. The competent traffic and movement expert will need to make it clear how they have defined whether a change (and the resultant effect) is considered significant or not”.

A quantitative approach to the assessment of traffic and transport related effects will be used, in accordance with the IEMA Guidelines. This relies on percentage changes in daily traffic movements along road links, which determine the significance of effect. However, some traffic and transport related effects, for example non-motorised user amenity and road safety, cannot be assessed using changes in traffic movements associated with the Scheme. To that end, the assessment carried out within this chapter will equally need to rely on other assessment criteria as set out in the IEMA Guidelines, alongside professional judgement.

Table C27 sets out the significance matrix used to determine significant effects. The shaded boxes indicate those significance ratings are deemed to be ‘significant’ effects (‘major’ or ‘moderate’). For this assessment, any effects with a significance level of minor or less are considered to be not significant. It should also be noted that any impacts may be temporary (such as construction traffic) or permanent; and that effects may be positive (beneficial) or negative (adverse).

Table C27: Significance of effects

Receptor Sensitivity	Magnitude of Change			
	High	Medium	Low	Negligible
Very High	Major	Major	Moderate	Minor
High	Major	Moderate	Moderate	Minor
Medium	Moderate	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

The significance of effect terms presented in **Table C27** are defined in **Table C28** below.

Table C28: Significance of effect definitions

Significance of effect	Indicative definition
Major	Changes which are likely to be perceptible and which would significantly change conditions which would otherwise prevail to the extent that it would significantly affect travel behaviour.
Moderate	Changes which are likely to be perceptible and which materially change conditions which would otherwise prevail to the extent that it may affect travel behaviour to a measurable degree.
Minor	Changes which are likely to be perceptible but not to the extent that they would materially change conditions which would otherwise prevail.
Negligible	Changes which are just perceptible.

Population

In the absence of statutory guidance for the assessment of likely significant effects on population receptors, the assessment methodology described in Design Manual for Roads and Bridges LA 112 Population and human health²²⁴ will be followed.

In accordance with DMRB LA 112, a population assessment should consider 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.

This should include likely effects during all phases of the Scheme i.e. construction, operation (including maintenance) and decommissioning. 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 in this preliminary assessment.

Through each of the five receptor groups outlined above, consideration will be given to the presence and number of receptors. Where receptors are absent from the study area, no further consideration will be given to the potential for significant effects.

²²⁴ Highways England (January 2020) Design Manual for Roads and Bridges: Sustainability & Environment Appraisal LA 112 Population and human health. [Online] Available at: <https://www.standardsforhighways.co.uk/tses/attachments/1e13d6ac-755e-4d60-9735-f976bf64580a?inline=true>

For each receptor that is present, professional judgement will be used to consider the likely effects that the Scheme would have and to determine if the effect is likely to be beneficial, neutral or adverse.

The receptor value (sensitivity) detailed in DMRB LA 112 will be used to determine the sensitivity of each receptor to change, as presented in **Table C29**.

Table C29: Environmental value (sensitivity) and descriptions

Receptor value (sensitivity)	Description
Very high	<p>Development land and businesses: 1) existing employment sites (excluding agriculture) and land allocated for employment (e.g. strategic employment sites) covering >5ha.</p> <p>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).</p> <p>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. 3) rights of way for walkers, cyclists and horse riders crossing roads at grade with >16,000 vehicles per day.</p>
High	<p>Development land and businesses: 1) existing employment sites (excluding agriculture) and land allocated for employment (e.g. strategic employment sites) covering >1 - 5ha.</p> <p>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).</p> <p>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.</p>
Medium	<p>Development land and businesses:</p>

Receptor value (sensitivity)	Description
	<p>1) existing employment sites (excluding agriculture) and land allocated for employment (e.g. strategic employment sites) covering <1ha.</p> <p>Agricultural land holdings:</p> <p>1) areas of land in which the enterprise is partially dependent on the spatial relationship of land to key agricultural infrastructure; and</p> <p>2) access between land and key agricultural infrastructure is required on a reasonably frequent basis (monthly).</p> <p>Walkers, cyclists and horse riders</p> <p>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</p> <p>2) rights of way for walkers, cyclists and horse riders crossing roads at grade with >4000 – 8000 vehicles per day.</p>
Low	<p>Development land and businesses:</p> <p>1) proposed development on unallocated sites providing employment with planning permission/in the planning process.</p> <p>Agricultural land holdings:</p> <p>1) areas of land which the enterprise is not dependent on the spatial relationship of land to key agricultural infrastructure; and</p> <p>2) access between land and key agricultural infrastructure is required on an infrequent basis (monthly or less frequent).</p> <p>Walkers, cyclists and horse riders:</p> <p>1) routes which have fallen into disuse through past severance, or which are scarcely used because they do not currently offer a meaningful route for either utility or recreational purposes, and/or</p> <p>2) rights of way for walkers, cyclists and horse riders crossing roads at grade with <4000 vehicles per day.</p>
Negligible	<p>Development land and businesses:</p> <p>1) N/A.</p> <p>Agricultural land holdings:</p> <p>1) areas of land which are infrequently used on a non-commercial basis.</p> <p>Walkers, cyclists and horse riders</p> <p>1) N/A.</p>

The magnitude of impact from DMRB LA 112 will be used to consider the likely level of impact to each key receptor, as presented in **Table C30**.

Table C30: Magnitude of impact and typical descriptions

Magnitude of impact (change)	Typical description
Major	<p>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.</p> <p>Walkers, cyclists and horse riders: >500m increase (adverse)/decrease (beneficial) in walkers, cyclists and horse riders journey length.</p>
Moderate	<p>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.</p> <p>Walkers, cyclists and horse riders: >250m - 500m increase (adverse) or decrease (beneficial) in walkers, cyclists and horse riders journey length.</p>
Minor	<p>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.</p> <p>Walkers, cyclists and horse riders: >50m - 250m increase (adverse) or decrease (beneficial) in walkers, cyclists and horse riders journey length.</p>
Negligible	<p>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.</p> <p>Walkers, cyclists and horse riders:</p>

Magnitude of impact (change)	Typical description
	<50m increase (adverse) or decrease (beneficial) in walkers, cyclists and horse riders journey length.
No change	No loss or alteration of characteristics, features, elements or accessibility; no observable impact in either direction.

The significance of effect will then be derived by combining the sensitivity of the receptor with the magnitude of impact as a result of the Scheme as presented in **Table C31**, and as described in DMRB LA 112. An effect of ‘Moderate’, ‘Large’ or ‘Very Large’ is deemed to be significant. A ‘Neutral’ or ‘Slight’ effect is deemed not significant.

Table C31: Significance matrix

	Magnitude of impact					
		No change	Negligible	Minor	Moderate	Major
Environmental value (sensitivity)	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

Climate

Given the international urgency of climate change, the sensitivity of the receptor (i.e., global climate) to fluctuations in greenhouse gas emissions is considered ‘Very High’. Thus, the level of the significance of effects is determined by the magnitude, and timing, of greenhouse gas emissions and the likelihood of avoiding severe climate change.

Aligned with IEMA’s Guide ‘Assessing Greenhouse Gas Emissions and Evaluating their Significance 2nd Edition’ (February 2022)²²⁵, any project that causes greenhouse gases to be avoided, or removed from the atmosphere, has a beneficial effect that is always significant (**Table C32**). In such a scenario, the project substantially exceeds the national net zero requirements and is thus aligned with the goal of the Paris Agreement to limit temperature rise to well below 2°C, aiming for 1.5°C.

²²⁵ Institute of Environmental Management and Assessment (IEMA) (2022) Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance. [Online].

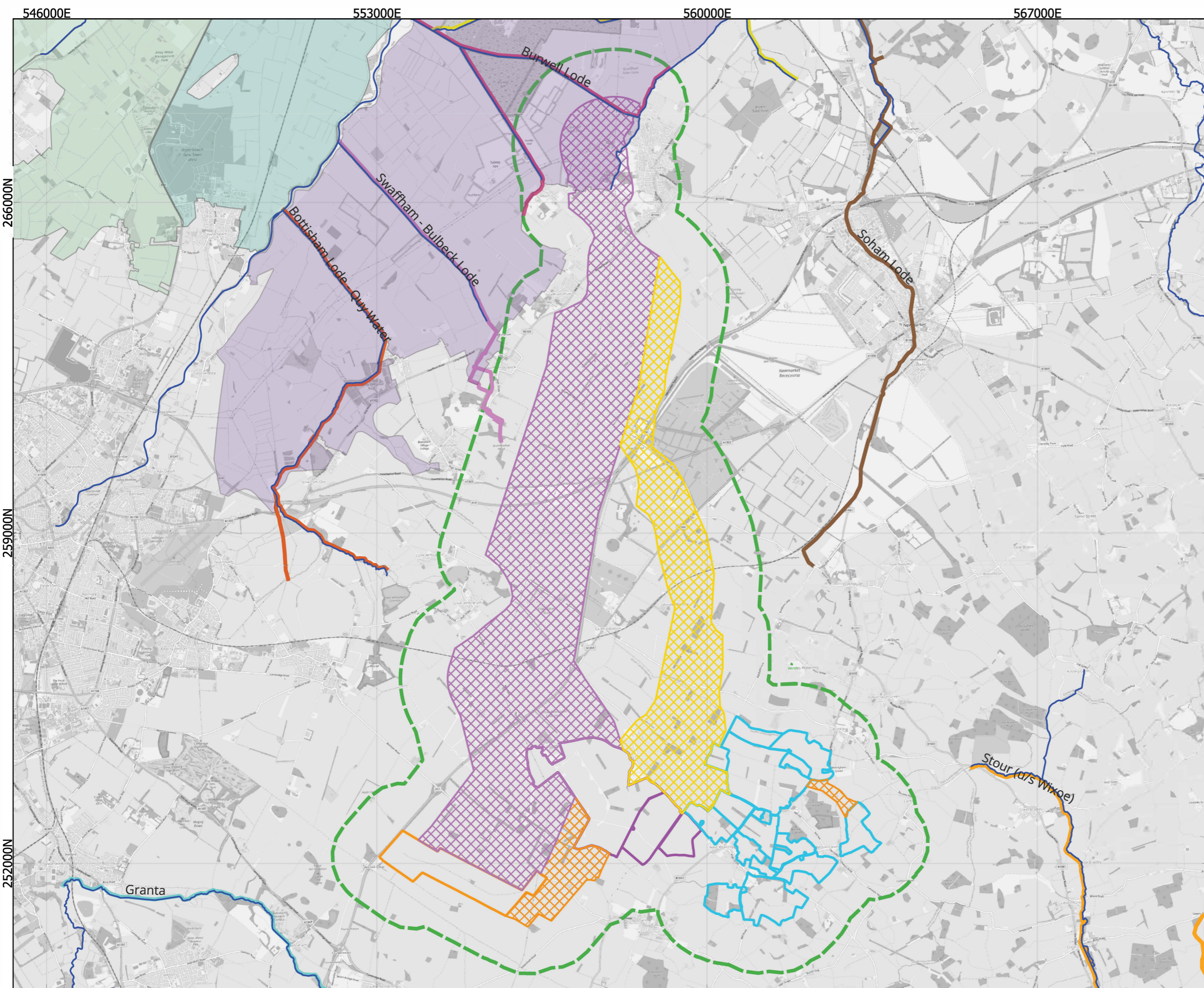
The significance of the GHG impacts of Scheme on the climate will be determined by assessing the magnitude of emissions against the Local Authority’s pro-rated carbon budget. The UK carbon budgets are only currently available to 2037 (6th carbon budget, 2033 – 2037); where carbon budgets are not available for certain assessment periods, a qualitative approach will be taken.

The renewable electricity from the Scheme is directly replacing that generated by fossil-fuel energy. Consequently, the GHG emissions savings from the operation of the Scheme will be assessed based upon a comparison of operational emissions per kWh energy generation against those from a gas-fuelled power station.

Table C32: Framework for assessment of significant 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 Paris Agreement (i.e., a science-based 1.5°C trajectory). Greenhouse gas impacts are not mitigated or reduced in line with local or national policy for projects of this type.
	Moderate adverse	Project’s greenhouse gas impacts are partially mitigated, and may partially meet up-to-date policy; however, emissions are still not compatible with the national Net Zero trajectory or aligned with the goals of the Paris Agreement.
Not significant	Minor adverse	Project may have residual emissions, but the project is compatible with the goals of the 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 Paris Agreement, complying with up-to-date policy and best practice.
Significant	Beneficial	Project causes greenhouse gas emissions to be avoided or removed from the atmosphere, substantially exceeding the goals of the Paris Agreement with a positive climate impact.

APPENDIX D: WATER FIGURES



Legend

- Study Area (Water)
- Main River
- Site boundary**
- Area A
- Area B
- Area C
- Connection Corridor
- Grid Connection Corridor A
- Grid Connection Corridor B

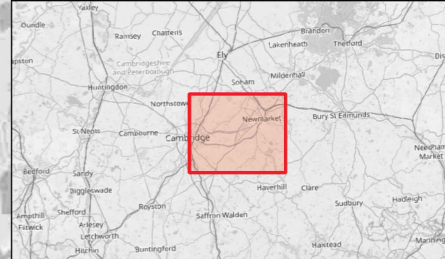
WFD Waterbodies (Cyc 3)

- Bottisham Lode - Quay Water
- Burwell Lode
- Granta
- New River
- Soham Lode
- Stour (u/s Wixoe)
- Swaffham - Bulbeck Lode

IDB

- Old West IDB
- Swaffam IDB
- Waterbeach Level IDB

CRS: EPSG:27700
 Projection: Transverse Mercator
 Ellipsoid: EPSG:7001
 Units: meters



01	10/12/2024	SCOPING	RSK	RSK	SK
Rev	Date	Description	Drn	Chk	App

663900 - Kingsway Solar Farm



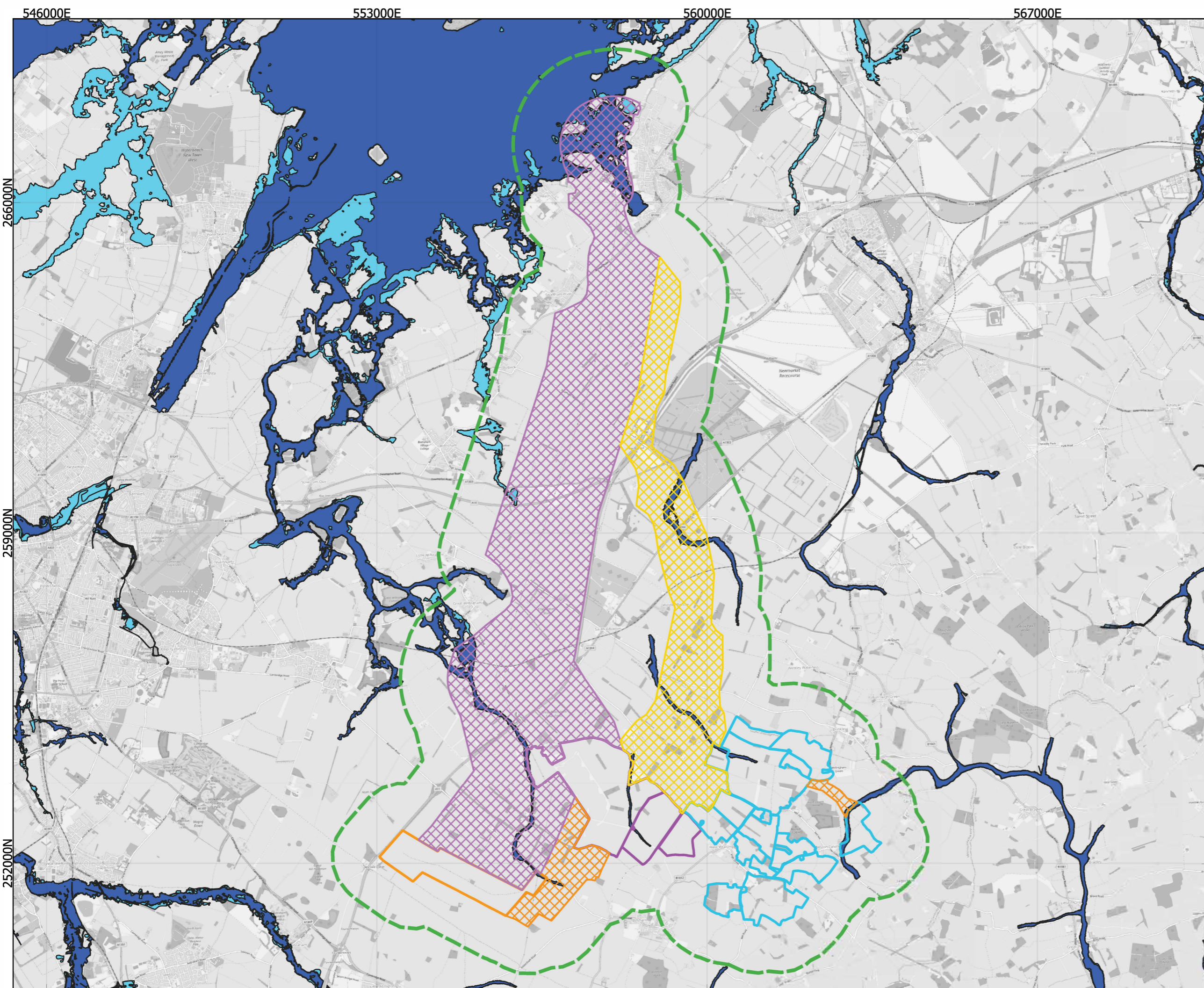
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 Hydrology Designations

ID: Fig D1

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 Kilometers
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REV 01

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 WFD River, Canal and Surface Water Transfer Waterbodies Cycle 2 © Environment Agency copyright and/or database right. Contains OS data Crown Copyright and database right (2023)
 Statutory Main River Map from © Environment Agency copyright and/or database right. Contains OS data Crown Copyright and database right (2023)



Legend

- Study Area (Water)
- Flood Zone 2
- Flood Zone 3

Site boundary

- Area A
- Area B
- Area C
- Connection Corridor
- Grid Connection Corridor A
- Grid Connection Corridor B

CRS: EPSG:27700
 Projection: Transverse Mercator
 Ellipsoid: EPSG:7001
 Units: meters

Rev	Date	Description	Drn	Chk	App
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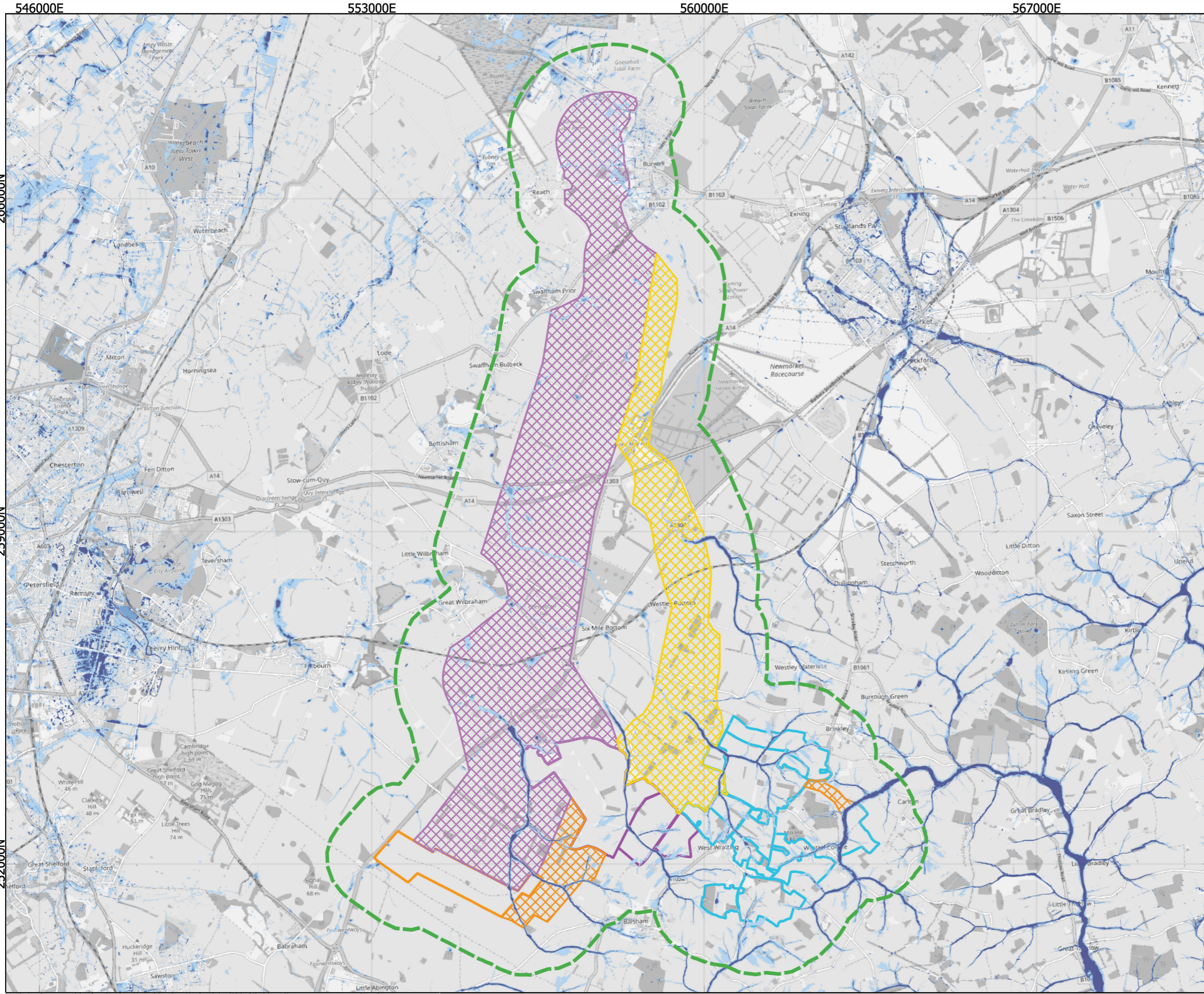
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Flood Zone Mapping

ID: Fig D2

Kilometers
Scale: 1:75000 @A3

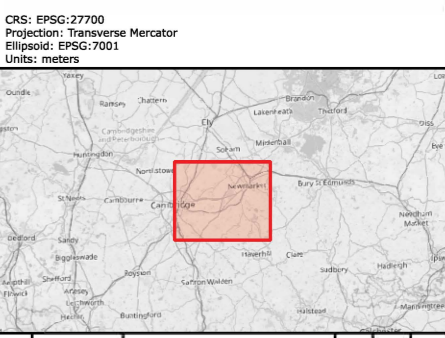
REV 01

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- Legend**
- Study Area (Water)
 - Site boundary**
 - Area A
 - Area B
 - Area C
 - Connection Corridor
 - Grid Connection Corridor A
 - Grid Connection Corridor B

- Risk of Flooding From Surface Water**
- High Risk (3.3% AEP)
 - Med Risk (1% AEP)
 - Low Risk (0.1% AEP)

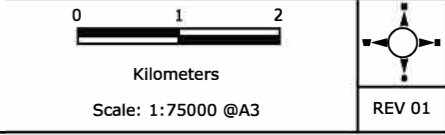


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663900 - Kingsway Solar Farm

**TITLE: Figure D3:
 Risk of Flooding From
 Surface Water**

ID: Fig D3



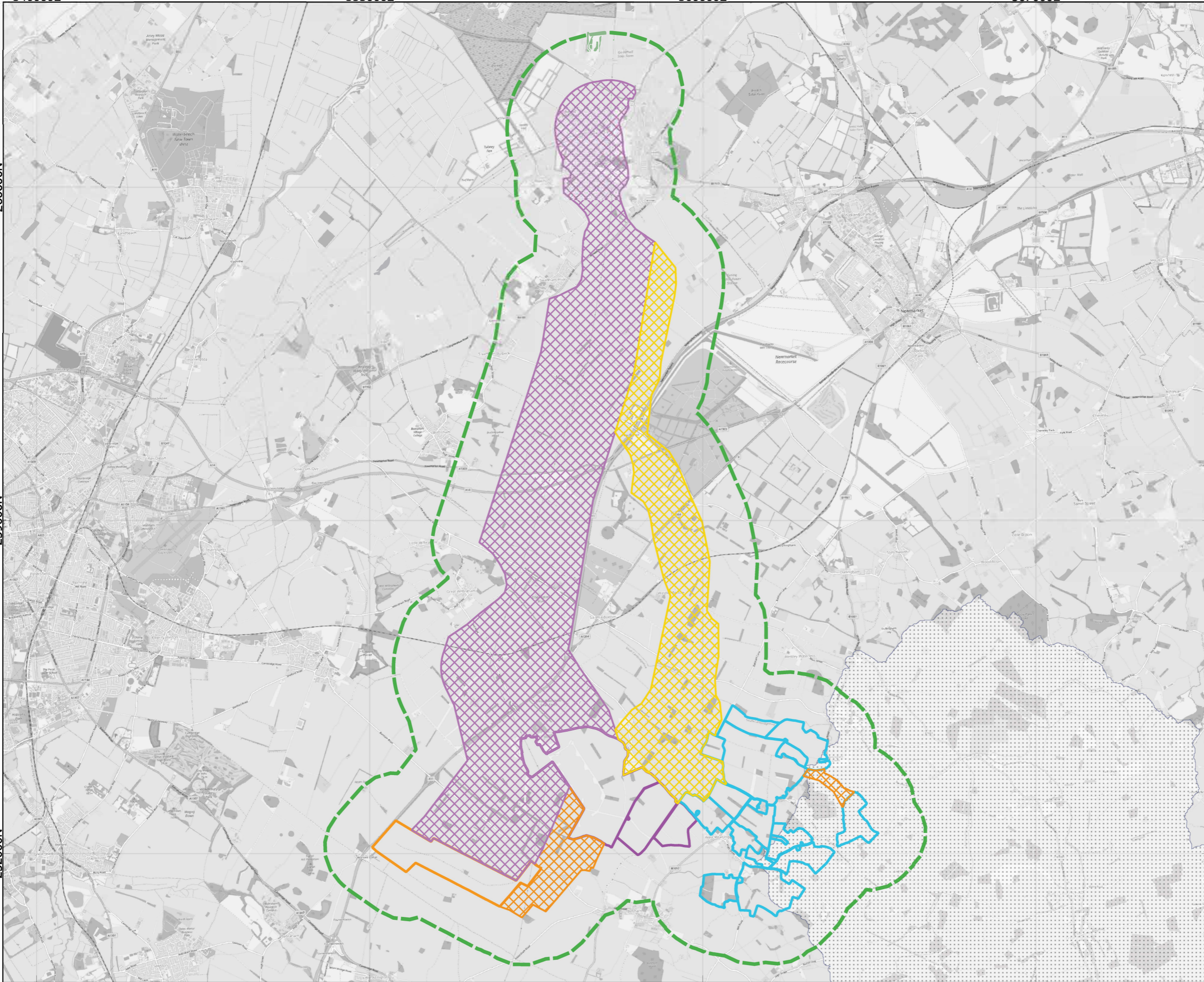
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546000E 553000E 560000E 567000E

266000N

259000N

252000N



Legend

Study Area (Water)

Site boundary

Area A

Area B

Area C

Connection Corridor

Grid Connection Corridor A

Grid Connection Corridor B

Drinking Water Safeguard Zones Surface Water

CRS: EPSG:27700
Projection: Transverse Mercator
Ellipsoid: EPSG:7001
Units: meters



Rev	Date	Description	Drn	Chk	App
01	10/12/2024	SCOPING	RSK	RSK	SK

663900 - Kingsway Solar Farm



TITLE: Figure D4:
Drinking Water Safeguard Zones

ID: Fig D4



Kilometers

Scale: 1:75000 @A3



REV 01