Rosefield Solar Farm

Outline Drainage Strategy (Clean)



EN010158/APP/7.11.4
Revision 4
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Rosefield Energyfarm Ltd

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Executive Summary

This Outline Drainage Strategy (ODS) supports the Development Consent Order (DCO) application for the Rosefield Solar Farm. It sets out the principles and framework for managing surface water drainage across the Site for the proposed permanent works during the operational phase, ensuring compliance with national and local planning policies and environmental standards. It also aligns with internal technical specifications and integrates feedback from Buckinghamshire County Council in their role as a Lead Loal Flood Authority (LLFA) and Buckingham and River Ouzel in their role as the Internal Drainage Board (IDB).

The strategy includes the following key components:

- Site Description and Proposed Development: The site comprises four parcels of land (Parcel 1, 1a, 2, and 3) and associated infrastructure.
- Drainage Strategy: The strategy focuses on sustainable drainage systems (SuDS) to manage surface water runoff. This includes the use of swales, attenuation ponds, and underground storage tanks to control runoff rates and volumes. The strategy aims to limit runoff rates to 4 l/s/ha and provide storage for up to 1 in 100-year storm event with a 25% climate change allowance.
- Exceedance Management: Measures are proposed to manage exceedance flows during extreme rainfall events. These include routing flows along low-risk pathways and directing them into SuDS features to minimize flooding risks.
- Water Quality: The strategy includes measures to protect water quality, such as utilising the treatment potential of SuDS elements, as well as the use of proprietary treatments such as oil separators and containment systems for potentially contaminated runoff from transformers and diesel generators.
- Stakeholder Engagement: The strategy has been developed in consultation with relevant stakeholders, including the LLFA and the IDB, to ensure compliance with local and national regulations.
- Conclusion: The ODS demonstrates that the proposed development can manage surface water runoff effectively, without increasing flood risk elsewhere. Detailed drainage design will be undertaken at a later stage to ensure compliance with the principles outlined in this strategy.

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1. Introduction

1.1. Purpose of this document

1.1.1. This document has been updated at Deadline 3 in response to further engagement with the Environment Agency to include proposals for emergency drainage scenarios for the Proposed Development and comments from agricultural tenants regarding surface water flows from Knowl Hill. The document references have not been updated from the original submission. Please refer to the **Guide to the Application [EN010158/APP/1.2.8]** for the list of current versions of documents.

1.1.2. This Outline Drainage Strategy (ODS) has been prepared on behalf of Rosefield Energyfarm Limited ('the Applicant') to support the Development Consent Order (DCO) application for the construction, operation (including maintenance), and decommissioning of Rosefield Solar Farm (hereafter referred to as the 'Proposed Development').

1.1.3. The purpose of this document is to outline how the Applicant plans to manage surface water runoff from for permanent works during the operational (including maintenance) phase of the Proposed Development, ensuring compliance with national, regional and local regulations on flood risk, drainage and pollution control, as well as adhering to the internal technical specifications set by the Applicant.

1.1.4. The ODS provides an assessment of surface water runoff to determine Site discharge rates and attenuation requirements. The ODS has been informed by an example design and has used reasonable worst case assumptions based on the Proposed Development footprints as stated in **ES Volume 1, Chapter 3: Proposed Development Description [EN010158/APP/6.1]** and construction characteristics expected for the proposed infrastructure as indicated on the **Illustrative Layout Plans and Sections [EN010158/APP/2.6]**.

1.1.5. The ODS also introduces appropriate Sustainable Drainage Systems (SuDS) measures to manage surface water runoff and ensure adequate runoff treatment. It has been developed based on the current Site characteristics and any existing constraints, such as existing vegetation and protected habitats.

1.1.6. By presenting a feasible strategy, the document demonstrates how the principles, measures and outcomes set out in the ODS can be effectively implemented.

1.1.7. Detailed drainage design would be undertaken at a later stage as part of the discharge of DCO requirements. The detailed design would be substantially in accordance with this ODS.

1.2. The Order Limits

1.2.1. The extent of the Order Limits are shown in **Location, Order Limits and Grid Coordinate Plans [EN010158/APP/2.1**] and the Proposed Development is described in full in **ES Volume 1, Chapter 3: Proposed Development Description [EN010158/APP/6.1]** and shown spatially on the **Works Plans [EN010158/APP/2.3].**

1.3. Limitations

1.3.1. This ODS focuses solely on the permanent works during the operational phase of the Proposed Development. The ODS for the temporary works, construction and decommissioning phases of the Proposed Development are outside of the scope of this ODS. The temporary works and construction phase drainage will be managed via the **Outline Construction Environmental Management Plan [EN010158/APP/7.2]**. The surface water management during the decommissioning phase is covered in the **Decommissioning Environmental Management Plan [EN010158/APP/7.4]**.

1.3.2. The findings of this ODS have been based on the review of available information and surveys undertaken to date. These findings pertain to the current development proposals, which are detailed in the following section of this ODS and presented in figures in **Annex A**.

1.3.3. At this stage, a detailed drainage design has not been undertaken and will be undertaken at detailed design as part of discharging the DCO requirements. At the detailed drainage design stage, the Applicant will have regard to the latest national guidance for sustainable drainage systems and engage with relevant stakeholders including the Lead Local Flood Authority (LLFA) or the Buckingham and River Ouzel Internal Drainage Board (IDB).

1.3.4. The Surface Water Drainage Strategy for Parcel 1 provides the baseline approach for managing surface water runoff across the Site. This strategy has informed the approach proposed for the part of Parcels 2 and 3 where solar panels, access roads (including Abnormal Indivisible Load (AIL) in Parcel 3) and Satellite Collector Compounds are proposed, as outlined below.

1.3.5. The primary focus of the Parcel 2 Surface Water Drainage Strategy presented in this report is on the BESS facility. The ODS for any associated PV panels, access roads and Satellite Collector Compound proposed within this parcel will follow the same approach and design principles as those proposed within Parcel 1.

1.3.6. Similarly, the Surface Water Drainage Strategy presented in this report for Parcel 3 focuses on the proposed Rosefield Substation and Main Collector Compound. The drainage for any associated PV panels and access roads will adopt the same approach and principles set out for Parcel 1.

1.3.7. This report also presents a high-level review of potential foul drainage options for the Proposed Development. Foul drainage, including design and discharge arrangements, would be developed and submitted for approval as part of the Detailed Drainage Design prior to commencement of relevant works, if required.

1.3.8. The scope of this ODS does not include a Fire Water Management Strategy. Fire water management for the BESS is covered in the **Outline Battery Safety Management Plan [EN010158/APP/7.9]**. Detailed design of the fire water containment systems (including final specification of isolation controls, attenuation capacity, containment and discharge management) for the BESS and Rosefield Substation would be developed at a later stage as part of the Detailed Drainage Design in accordance with the site-specific Emergency Response Plan as outlined in the **Outline Operational Environmental Management Plan (OEMP) [EN010158/APP/7.3]**.

1.4. Legislative framework, planning policy and guidance

1.4.1. This ODS has been undertaken to comply with the following legislation, planning policy and guidance, based on experience of similar projects and professional judgement.

Legislation

- The Land Drainage Act 1991 sets out the responsibilities of Local Authorities and Drainage Boards in relation to land drainage. This Act outlines the responsibilities of riparian owners and internal drainage boards (IDBs) to maintain watercourses and prevent obstruction to flow. It is directly relevant to land adjacent to watercourses and the legal duties of landowners [Ref. 1];
- The Flood and Water Management Act 2010 is central to drainage strategy planning. It defines responsibilities for managing flood risk, establishes Lead Local Flood Authorities (LLFAs), and promotes sustainable drainage systems (SuDS) in new developments. It also mandates local flood risk management strategies and supports coordination among authorities [Ref. 2];
- The Water Resources Act 1991 governs water quality, pollution control, and flood defence. It is particularly relevant for ensuring that drainage systems do not cause pollution and that discharges are properly permitted [Ref. 3];
- The Flood Directive 2007/60/EC [Ref. 4] is transposed into legislation for England via the Retained EU Law (Revocation and Reform) Act 2023 [Ref. 5]. It supports integrated planning and coordination across catchments, which is essential for strategic drainage planning;
- The Environment Act 2021 includes laws that relate to environmental protection including nature protection, water quality and clean air. It offers new powers to set new binding targets, including for air quality, water, biodiversity, and waste reduction. It also affects IDBs and drainage authorities by requiring biodiversity assessments and enabling updated land valuation for drainage charges [Ref. 6];

- The Water Industry Act 1991 [Ref. 7] sets out the main powers and duties of the water and sewerage companies. The Water Act 2003 [Ref. 8] and the Water Act 2014 [Ref. 9] have modified the framework set out under the Water Industry Act 1991 such that it now includes statutory Drainage under Section 94A;
- The Water Environment (Water Framework Directive (WFD)) (England and Wales) Regulations 2017 influences drainage design to avoid deterioration of water quality and support River Basin Management Plans [Ref. 10]; and
- Building Regulations 2010 Part H (2023 Edition). The Building Regulations 2010 are a statutory instrument under the Building Act 1984, and Part H specifically deals with drainage and waste disposal. It sets legal requirements for foul and surface water drainage, including pipe sizing, layout and protection [Ref. 11].

National Planning Policy

- National Planning Policy Framework (2025) [Ref. 12]. Section 14 'Meeting the challenge of climate change, flooding and coastal change' sets out the criteria for development and flood risk by stating that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. The 2024 update makes Sustainable Drainage Systems (SuDS) a non-negotiable requirement for this proposed development, especially given its sensitivity to surface water;
- Overarching National Policy Statement for Energy (NPS EN-1) (2023), Department for Energy Security and Net Zero – Section 5.8 'Flood Risk' outlines the requirements in relation to flood risk and flood risk management, and the requirements for surface water drainage [Ref. 13];
- National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (2023) – Section 2.10 considers solar development, specifically in relation to the layout and design which should consider the mitigation of flood risk [Ref. 14]; and
- National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (2023) – Section 2.3 details issues relating climate change and outlines the considerations required in relation to flood risk [Ref. 15].

Local Planning Policy

- Vale of Aylesbury Local Plan (VALP) 2013 – 2033 (Adopted September 2021), specifically Policy I4 'Flooding' requires developments to be supported by a Flood Risk Assessment which demonstrates that the

development will be safe from flooding for its lifetime, without increasing flood risk elsewhere and will explore opportunities to reduce flood risk overall. Where relevant, proposals must pass the Sequential Test and where appropriate the Exceptions Test. All development will be required to design and use sustainable drainage systems (SuDS) for the effective management of surface water run-off on site. Policy I5 'Water resources and wastewater infrastructure' seeks to improve water quality, ensure adequate water resources, promote sustainability in water use and ensure wastewater collection and treatment has sufficient capacity. This directly supports the objectives of this ODS by ensuring infrastructure is in place to manage runoff and protect receiving water bodies [Ref. 16];

- Local Plan for Buckinghamshire: Draft Vision and Objectives for 2040, specifically Objective 1 'Natural and built environment' aims to conserve and enhance Buckinghamshire's valued natural, historic, and built environments, to ensure they are protected from inappropriate development. The Local Plan will look to improve water quality in rivers and watercourses, prioritising chalk streams. Objective 2 'Mitigating/adapting to climate change' which aims to ensure the delivery of sustainable development, mitigating climate change and adapting to the impacts on Buckinghamshire's environment; and Objective 6 'Infrastructure' which aims to ensure the right infrastructure required to support communities is provided in the right place and at the right time, and make best use of existing facilities [Ref. 17].
- Aylesbury Vale Watercourse Advice Note: NE2 River and stream corridors. Development proposals must not have an adverse impact on the functions and setting of any watercourse and its associated corridor. They should conserve and enhance the biodiversity, landscape and consider the recreational value of the watercourse and its corridor through good design. Planning permission will only be granted for proposals which do not involve the culverting of watercourses and which do not prejudice future opportunities for de-culverting. Development proposals adjacent to or containing a watercourse shall provide or retain a 10m ecological buffer (unless existing physical constraints prevent) from the top of the watercourse bank and the development and include a long-term landscape and ecological management plan for this buffer [Ref. 18].

Guidance

- Flood Risk and Coastal Change National Planning Practice Guidance (Department for Levelling Up, Housing and Communities, 2022) **[Ref. 19];**

- Flood Risk Assessments: climate change allowances (Environment Agency, 2022) **[Ref.** 20**];**
- Design Manual for Roads and Bridges (DMRB) LA 113 Road Drainage and the Water Environment (National Highways 2020) **[Ref. 2**1**];**
- The CIRIA SuDS Manual C753 (2007) **[Ref. 2**2**];**
- LASOO Non-Statutory Technical Standards for Sustainable Drainage Systems (2015) **[Ref. 2**3**];**
- Environment Agency 'Flood risk assessment: flood zones 1, 2, 3 and 3b' guidance (2024) **[Ref. 2**4**];**
- Buckinghamshire County Council Sustainable Drainage Systems guidance for developers (2022) **[Ref. 2**5**];** and
- Planning guidance for the development of large-scale ground mounted solar PV systems (BRE National Solar Centre, 2014) **[Ref. 2**6**].**

1.5. Data Sources

1.5.1. The following documents have been reviewed to inform this report.

- The British Geological Survey (BGS) Geology Mapping **[Ref. 27];**
- Defra's MAGIC Maps **[Ref. 28];**
- Environment Agency Main River mapping **[Ref. 30];**
- Environment Agency climate change allowances **[Ref. 20];**
- Internal Drainage Board (IDB) Interactive mapping **[Ref. 31];**
- FEH22 Rainfall data, UK Centre for Ecology & Hydrology [**Ref. 32];**
- Hydrologic Response of Solar Farms **[Ref. 33],** and
- BRE planning guidance for the development of large-scale ground mounted solar PV systems **[Ref. 34].**

2. Site Description and Proposed Development

2.1. Site Location

2.1.1. The location of the Proposed Development is shown in **ES Volume 3, Figure 1.1: Location Plan [EN010158/APP/6.3]**. The Order Limits presented in **ES Volume 3, Figure 1.2: Order Limits [EN010158/APP/6.3]** constitute the maximum extent of land that would be required to facilitate the construction, operation (including maintenance), and decommissioning of the Proposed Development. The land within the Order Limits comprises

approximately 675.05 hectares (ha) of land and is hereafter referred to as the 'Site'.

2.1.2. The Site is located within the administrative boundary of Buckinghamshire Council. The settlements of Calvert, Middle Claydon, Botolph Claydon, East Claydon and Hogshaw lie within 1.5km of parts of the Order Limits. Further afield (within 3km of the Order Limits) lie the settlements of Steeple Claydon, Edgecott, Shipton Lee, Quainton, Granborough and Winslow.

2.1.3. The Site comprises four parcels of land (Parcel 1, 1a, 2 and 3), the Interconnecting Cable Corridor, the Grid Connection Cable Corridor, the National Grid East Claydon Substation, and associated access. These parcels and cable corridors are outlined in **ES Volume 3, Figure 1.2: Order Limits [EN010158/APP/6.3]** and detailed further below.

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

2.1.5. Parcel 1 is situated in the west, Parcel 1a is south east of Parcel 1, Parcel 2 in the central area and Parcel 3 in the northeast. The **ES Volume 3, Figure 3.5: Zonal Masterplan [EN010158/APP/6.3]** indicates location of each area within the Proposed Development. This is also presented in **Annex A**.

2.1.6. The British National Grid coordinate references provided below are for the approximate centre of each area, whereas more detailed description of each Parcel's location is described further in this section.

- Parcel 1: SP 702 244;
- Parcel 1a: SP 709 229;
- Parcel 2: SP 730 231; and,
- Parcel 3: SP 753 255.

Parcel 1

2.1.7. Parcel 1 is the western most parcel of the Proposed Development and measures 183ha. Parcel 1 is bordered by several woodland blocks including Shrubs Wood, Decoypond Wood and Sheephouse Wood. Calvert Road sits on the northern boundary of Parcel 1. Parcel 1 is located in close proximity to an active High Speed Rail (HS2) works area, which is located approximately 100m south of the Order Limits.

Parcel 1a

2.1.8. Parcel 1a is the smallest parcel (17ha) and is located to the south east of Parcel 1. Parcel 1a is bordered by Sheephouse Wood to the north west, Romer Wood and Greatsea Wood to the east, Muxwell Brook to the north

and by hedgerows to the south. Parcel 1a is also located in close proximity to the active HS2 works area, which is located approximately 100m west of the Order Limits.

Parcel 2

2.1.9. Parcel 2 is located approximately 1km east of Parcel 1a and is 203.5ha. Parcel 2 is bordered by Runt's Wood to the west, Finemere Wood to the south and the residential settlement of Botolph Claydon directly to the north.

Parcel 3

2.1.10. Parcel 3 is the northern most parcel of land within the Proposed Development and is 50.6ha. Adjacent to Parcel 3 lies the existing National Grid East Claydon Substation which would be the point of grid connection for the Proposed Development.

2.2. Proposed Development

2.2.1. The Proposed Development comprises the construction, operation (including maintenance), and decommissioning of solar photovoltaic ('PV') development and energy storage, together with associated infrastructure and an underground cable connection to the National Grid East Claydon Substation.

2.2.2. The Proposed Development would include a generating station with a total exporting capacity exceeding 50 megawatts ('MW').

2.2.3. A detailed description of the Proposed Development is included in ES Volume 1, Chapter 3: Proposed Development Description [EN010158/APP/6.1].

2.2.4. The Illustrative Layout Plans and Sections [EN010158/APP/2.6] is reproduced in Annex A.

2.2.5. The Proposed Development is described in Schedule 1 of the **Draft DCO [EN010158/APP/3.1]**, where the "authorised development" is divided into work numbers. The work numbers ('Work No.') for those packages are identified below and are referred to throughout this ES and correspond to the areas shown on the **Works Plans [EN010158/APP/2.3]**. There is overlap of Work Nos. in some locations and so the sum of the Order Limits is not equal to the sum of the Work Nos.:

- Work No. 1: Ground Mounted Solar PV Generating Station
- Work No. 2: Rosefield Substation Compound
- Work No. 2A: Rosefield Substation Compound
- Work No. 2B: Abnormal Indivisible Load Corridor
- Work No. 3: Satellite Collector Compounds

- Work No. 3A: Satellite Collector Compounds
- Work No. 3B: Satellite Collector Compound Transformer
- Work No. 4: Battery Energy Storage System Compound
- Work No. 5: Main Collector Compound
- Work No. 6: Grid Connection Cabling Corridor
- Work No. 7: Interconnecting Cabling Corridor(s)
- Work No. 8: Temporary Construction and Decommissioning Compounds
  - Work No. 8A: Primary Construction Compounds; and
  - Work No. 8B: Secondary Construction Compounds
- Work No. 9: Highways Works (Facilitate access)
- Work No. 10: Green and Blue Infrastructure

2.2.6. The **Draft DCO [EN010158/APP/3.1]** also allows for the following works to occur in connection with and in addition to the Work Nos. set out above within the Order Limits for those work areas. This has been considered within the assessments undertaken in this ES:

- fencing, gates, boundary treatment and other means of enclosure;
- bunds, embankments, trenching and swales;
- works to the existing irrigation system(s) and works to alter the position and extent of such irrigation system(s);
- surface water drainage systems, storm water attenuation systems including storage basins, oil water separators, including channelling and culverting and works to existing drainage networks;
- electrical, gas, water, foul water drainage and telecommunications infrastructure connections, diversions and works to, and works to alter the position of, such services and utilities connections;
- works to alter the course of, or otherwise interfere with, non-navigable rivers, streams, or watercourses;
- works for the provision of security and monitoring measures such as CCTV columns and CCTV, security cabins, lighting columns and lighting and weather stations;
- improvement, maintenance, repair and use of existing streets, private tracks, and access roads;
- laying down, maintenance and repair of new internal access tracks, ramps, means of access, permissive footpaths and roads, crossings of

drainage ditches and watercourses, including signage and information boards;

- temporary and permanent PRoW diversions and closures and new and/or improvements to infrastructure (e.g., gates and stiles) along temporarily or permanently diverted PRoW Footpaths;
- landscaping and biodiversity mitigation and enhancement measures including planting;
- tunnelling, boring and drilling works;
- earthworks, site establishments and preparation works including site clearance (including vegetation removal);
- earthworks (including soil stripping and storage and site levelling) and excavations; the alteration of the position of services and utilities; and works for the protection of buildings and land; and other works to mitigate any adverse effects of the construction, operation (including maintenance) or decommissioning of the authorised development.

2.3. Site Topography

2.3.1. Parcels 1 and 1a are gently undulating with the highest point being Knowl Hill at around 116 meters Above Ordnance Datum (AOD) as shown on ES Volume 3, Figure 2.3: Topography Plan [EN010158/APP/6.3]. The rest of Parcel 1 is at an elevation of 80-90m AOD and Parcel 1a at an elevation of 79-84m AOD.

2.3.2. Parcel 2 is located on a low ridge crest at 136m AOD and Parcel 3 is located on relatively flat ground at 90-94m AOD on the north east of the ridge. **ES Volume 3, Figure 2.3: Topography Plan [EN010158/APP/6.3]** provides further detail on the topography of the Internal Access Corridors, Interconnecting Cable Corridors and Grid Connection Cable Corridor.

2.3.3. The Site is located on a watershed between two river catchments. The northern section of the Site drains north/north east towards the Padbury Brook and the Claydon Brook that form part of the wider Great Ouse catchment which generally drains to the north east. The southern section of the Site drains towards the River Ray to the south/south west and forms part of the wider River Thames catchment which drains to the south/south east. The upstream section of the River Ray flowing through the south east area of Parcel 1a is known as the Muxwell Brook.

2.3.4. High level analysis of Defra's ground survey data (provided as Light Detection and Ranging survey data) within QGIS has been reproduced in **ES Volume 4, Appendix 16.1 Flood Risk Assessment, Figure 2.1 [EN010158/APP/6.4].**

2.4. Site Geology

2.4.1. Based on the BGS published geological records for the area **[Ref. 27]** and information included in **ES Volume 4 - Appendix 11.1 - Preliminary Risk Assessment [EN010158/APP/6.4]**:

- Across the majority of the Site there is no superficial deposits recorded, however, there are small pockets of Glaciofluvial Deposits (Sand and Gravel), Glacial Deposits (Clay, Sand and Silt) and Till (Diamicton) throughout the Site and areas of Alluvium (Clay, Sand, Silt and Gravel) and River Terrace Deposits (Sand and Gravel) around the Claydon Brook and Claydon Brook Tributary to the north.
- The bedrock geology of the Site consists of areas of West Walton Formation (Mudstone) and Weymouth Member (Mudstone) in the south and eastern areas; and Stewartby Member (Mudstone) and Peterborough Member (Mudstone) in the northern and western regions.

2.4.2. A geological summary of both superficial and bedrock geology for each Parcel is presented within **Table 2.1** below.

2.4.3. A site-specific Ground Investigation has been carried out across Parcel 1 in November 2024 (**ES Volume 4 - Appendix 11.3 - Ground Investigation Report [EN010158/APP/6.4]**) and a summary of its findings is presented in **Table 2.2** below.

2.4.4. As part of the on-site Ground Investigation soakaway testing to BRE365 has been undertaken in two locations across Parcel 1. A summary of the results is presented in **Table 2.3**. Further infiltration testing will be carried out ahead of detailed design in the vicinities of each pond location, subject to accessibility.

2.5. Table 2.1 - Superficial and Bedrock Geology Summary [Ref. 27]

Parcel	Superficial Geology	Solid Geology*
Parcel 1	The majority of Parcel 1 has no superficial deposits recorded, with the exception of a small area in the south/central part of the Site, directly west of Knowl Hill. This area comprises of mostly Glacial Deposits (clay, silt and sand) and two smaller areas of Glaciofluvial Deposits (sand and gravel).	The majority of Parcel 1 is underlain by Stewartby Member Mudstone. Two small sections; one in the central south is underlain by Weymouth Member Mudstone and another in the northwest is underlain by Peterborough Member Mudstone.
Parcel 1a	The majority of Parcel 1a has no superficial deposits recorded, with the exception	All of Parcel 1a is underlain by Stewartby Member Mudstone.

Parcel	Superficial Geology	Solid Geology*
	of a small area to the south which is composed of alluvium (clay, silt, sand and gravel).	
Parcel 2	The far south part of Parcel 2 (and the northern part of the southern potential extension area) is underlain by Till (stony clay) with a very small area of Glacial deposits (clay, silt, sand) and very localised pocket of Glaciofluvial Deposits (sand and gravel). A very small area of Alluvium (clay, silt, sand and gravel) deposits is recorded on the northeastern boundary of Parcel 2 and a very small section of Glaciofluvial deposits (Sand and gravel) is indicated in the northern part of the northern potential site expansion area.	Parcel 2 is predominately underlain by Mudstone of the West Walton formation, with a section in the northeast of the Site that is underlain by Weymouth Member Mudstone.
Parcel 3	No recorded superficial deposits apart from Alluvium (clay, silt, sand and gravel) and river terrace deposits (sand and gravel) along the eastern and northeastern edge of Parcel 3 respectively and potential extension area, associated with a small stream.	All of Parcel 3 is recorded to be underlain by the Weymouth Member Mudstone.

* Solid geology strata expected to underlie superficial deposits where present.

2.6. Table 2.2 - Ground Investigation Summary

TP Ref.	Location	Description (depths in mbgl)
TP001 (Trial Pit)	Eastern area of Parcel 1 around	Strata is recorded as gravelly clay.

TP Ref.	Location	Description (depths in mbgl)
	150m from eastern border	0.00–0.20 Grass over soft brown silty clay with rootlets 0.20–3.00 Firm heavily mottled grey slightly gravelly slightly sandy silty clay
TP002 (Trial Pit/Soakaway)	Western area of Parcel 1, 40m from boundary and 300m from northwest corner	Strata is recorded as slightly gravelly clay. 0.00–0.25 Made Ground: Grass over firm clay 0.25–0.90 Stiff mottled slightly gravelly slightly sandy clay 0.90–3.00 Stiff locally mottled clay with coarse quartz and chalk.
TP003 (Trial Pit)	Most western investigation, in southwest of Parcel 1 along the border.	Strata is recorded as slightly gravelly clay. 0.00–0.30 Made Ground: Grass over firm clay 0.30–0.95 Firm slightly gravelly mottled clay with coarse quartz and chalk. 0.95-3.00 Stiff mottled slightly gravelly clay with fine quartz.
TP007 (Hand Pit)	Along northern border west of centre. Located around 30m from boundary	Strata is recorded as slightly gravelly clay. 0.00–0.15 Made Ground: Grass over soft yellowish brown gravelly silty clay 0.15–1.30 Firm yellowish grey mottled, slightly gravelly clay, becoming stiff at 1.00m
TP008 (Hand Pit)	Slightly west of centre, around 230m from north and south boundary.	Strata is recorded as slightly gravelly firm clay. 0.00–0.50 Made Ground: Firm dark yellowish brown silty clay with gravel 0.50–1.30 Firm heavily mottled clay, becoming stiff at 1.00m
TP011 (Hand Pit)	Very slightly easy of centre of Site	Strata is recorded as slightly gravelly clay. 0.00–0.20 Made Ground: Firm slightly gravelly silty clay 0.20–0.80 Made Ground: Firm heavily mottled clay

TP Ref.	Location	Description (depths in mbgl)
		0.80–1.50 Firm to stiff heavily mottled, slightly gravelly, slightly sandy, clay with chalk gravel
TP012 (Hand Pit)	East of centre as Site begins to become wider	Strata is recorded as made ground over slightly gravelly clay. 0.00–1.50 Made Ground: Grass over soft mottled slightly gravelly silty clay, becoming firm at 0.9m.
TP013 (Dynamic Sampling)	Northern eastern corner of Parcel 1 located along the northern boundary and around 200m from northeast corner	Strata is recorded as slightly gravelly clay. 0.00–0.30 Topsoil Sandy gravelly clay. Gravel is subangular fine to medium chalk and flint. 0.30–1.00 Stiff clay with fine to medium sand. 1.00–2.90 Slightly sandy clay. Sand is fine to medium. 2.90–5.00 Slightly gravelly slightly sandy clay. Gravel is chalk. No groundwater encountered. End of hole at 5.00m
TP014 (Trial Pit/ Soakaway)	Southeastern corner of Parcel 1. Located around 190m from southeast corner	Strata is recorded as slightly gravelly clay with quartz below 1.5m 0.00–0.20 Made Ground of locally mottled clay with roots and rootlets, and fine to coarse quartz, mudstone and brick 0.20–0.90 Soft to firm heavily mottled slightly gravelly silty clay with roots and rootlets. 0.90–1.10 Firm gravelly sandy silty clay with shell fragments and fine to coarse chalk and quartz 1.10–3.00 Slightly gravelly slightly sandy clay with only quartz gravel below 1.50m. End of pit at 3.00m

2.7. Table 2.3 - Soakaway Testing Summary

TP Ref.	Location	Description
TP002	Western side of Parcel 1, 40m from boundary and 300m from northwest corner	A single soakaway test was conducted in an excavation dug to a depth of 1.50 metres. The test lasted around 120 minutes and showed a water level drop of about 20 mm. Soil infiltration rate (*f* value) has not been calculated given that the required 25% effective depth was not reached. This result indicates very low infiltration capacity due to the clay stratum present at the test depth.
TP014	Southeastern corner of Parcel 1. Located around 190m from southeast corner	A single soakaway test was carried out in an excavation dug to a depth of 1.50 metres. Over the course of roughly one hour, the water level dropped by only around 10 mm, again suggesting poor infiltration characteristics in the underlying clay material. Infiltration coefficient (k value) has not been calculated given that the required 25% effective depth was not reached. This result indicates very low infiltration capacity due to the clay stratum present at the test depth.

2.8. Site Hydrogeology

2.8.1. Error! Reference source not found.**2.4** provides a summary of aquifer designations identified for the Site based on the information published on Defra MAGIC Maps **[Ref. 28],** and **ES Volume 4 - Appendix 11.1 - Preliminary Risk Assessment [EN010158/APP/6.4]**.

2.8.2. The Site does not lie within any designated Source Protection Zone (SPZ).

2.9. Table 2.4 - Aquifer Designation Summary

Parcel	Hydrogeology	
Parcel 1	Superficial Aquifer Designation	Glacial Deposits: Secondary Undifferentiated; Medium Vulnerability, Secondary Aquifer. Glaciofluvial Deposits: Secondary A Aquifer; Medium Vulnerability, Secondary Aquifer.
	Bedrock Aquifer Designation	Unproductive Strata.
Parcel 1a	Superficial Aquifer Designation	Alluvium Deposits: Secondary A Aquifer; Medium Vulnerability, Secondary Aquifer.
	Bedrock Aquifer Designation	Unproductive Strata.
Parcel 2	Superficial Aquifer Designation	Glacial & Till Deposits: Secondary Undifferentiated; Medium Vulnerability, Secondary Aquifer. Glaciofluvial & Alluvium Deposits: Secondary A Aquifer; Medium Vulnerability, Secondary Aquifer.
	Bedrock Aquifer Designation	Unproductive Strata.
Parcel 3	Superficial Aquifer Designation	Alluvium Deposits: Secondary A Aquifer; Medium Vulnerability, Secondary Aquifer River Terrace Deposits: Secondary A Aquifer; Medium Vulnerability, Secondary Aquifer.
	Bedrock Aquifer Designation	Unproductive Strata

2.9.1. BGS borehole records available within the Site were reviewed to assess groundwater presence (**ES Volume 4 - Appendix 11.1 - Preliminary Risk Assessment, Appendix D [EN010158/APP/6.4]**). Borehole record Ref. SP72SW6, located on Knowl Hill in the southern part of Parcel 1, indicates the presence of groundwater springs on Knowl Hill. This location is noted to

have been historically used for supplying water to Great Pond Farm and Know Hill Farm. In contrast, several borehole records located along the railway line to the southwest of Parcel 1 indicate no groundwater presence.

2.9.2. The Ground Investigation undertaken in February 2024 (**Table 2.2)** (**ES Volume 4 - Appendix 11.3 - Ground Investigation Report [EN010158/APP/6.4]**) included a number of Window Sample and Trial Pit locations, including two Infiltration Tests undertaken within Parcel 1. It is likely that isolated pockets of groundwater are beneath the Site within bands of permeable deposits (superficial sands and gravels) rather than a continuous shallow groundwater body. The infiltration testing results indicate that infiltration drainage will not be feasible due to the slow infiltration rates encountered. It is also noted that the predominant subsoil and superficial geology across the Site is Clay, and where pockets of Sand are present, these are generally thin in nature and clay rich. Where present, shallow groundwater is likely to flow locally towards the Ordinary Watercourses within the vicinity of the Site.

2.10. Site Hydrology

2.10.1. A review of the online Main River mapping published by Environment Agency (EA) **[Ref. 30]** indicates that there are main rivers situated within the extents of the Order Limits. The nearest main river located in the vicinity of the Site is a tributary of River Ray south of the Site, flowing southwest.

2.10.2. The following ordinary watercourses are located within the extents of the Order Limits and are annotated accordingly in **Figure 16.1: Watercourses [EN010158/APP/6.3]**:

- Claydon Brook flowing along eastern boundary of Parcel 3 and its tributaries located to the east of Parcel 3;
- An unnamed tributary of Claydon Brook crossing underneath Claydon Road along southeastern edge of Parcel 2;
- Muxwell Brook, a tributary of River Roy located to the southeast of Parcel 1, originating further east in Balmore Wood or Runt's Wood;
- An unnamed tributary of The Twins or Padbury Brook flowing along western edge of Parcel 1; and
- An unnamed tributary of The Twins or Padbury Brook flowing across northeast of Parcel 1.

2.10.3. Parcel 1 area is noted to have a wide network of drainage ditches bordering each field. More detailed information regarding onsite watercourse network is included in **ES Volume 2, Chapter 16: Water [EN010158/APP/6.2]**.

2.10.4. From the list of Ordinary Watercourses provided in Paragraph 2.6.2, the following watercourses are maintained by the Buckingham and River Ouzel

IDB; these have also been annotated in **Figure 16.1: Watercourses [EN010158/APP/6.3]**. The remaining watercourses are maintained by the LLFA.

- Claydon Brook to the east of Parcel 3; and
- An unnamed tributary of The Twins or Padbury Brook flowing along western edge of Parcel 1.

2.10.5. The majority of the Site lies within Flood Zone 1, although some fields, particularly at the eastern extent of Parcel 3 are located in Flood Zone 2 and 3. A Flood Risk Assessment (FRA) has been undertaken for the Proposed Development for the overall flood risk evaluation and to support the DCO Application (**ES, Volume 4, Appendix 16.1: Flood Risk Assessment [EN010158/APP/6.4]**).

2.11. Existing Drainage and Other Utilities

2.11.1. A review of the available information on existing underground utilities indicates that there are no surface water drainage assets present within the Order Limits. This is shown in **ES Volume 3, Figure 5.1 (Sheets 1-5): Desk-based Study of Existing Utilities [EN010158/APP/6.3]**.

2.11.2. The nearest identified foul sewer assets are located outside of the Order Limits, along Orchard Way in Botolph Claydon. This foul sewer is located approximately 700m north of the BESS area and 2km east of the edge of Parcel 1.

2.11.3. Utilities such as water supply, British Telecom (BT) and electricity cables are primarily located along the highway north of Parcels 1 and 2 and the track to the east of Parcel 1.

2.11.4. Electric, BT and water supply assets are also located within and adjacent to the National Grid East Claydon Substation, to the north of Parcel 3.

2.11.5. Full survey outputs available are provided in **Annex B**.

3. Stakeholder Engagement

3.1.1. **Table 3.1** provides a summary of the stakeholder engagement activities undertaken to inform this ODS.

3.1.2. All relevant correspondence and meeting notes are presented in **Annex C**.

3.2. Table 3.1 – Summary of stakeholder engagement

Consultee	Date of engagement	Summary	Outcome of engagement
Buckinghamshire Council - Lead Local Flood Authority	19 February 2025	Conference call with LLFA to review comments to the PEIR. Questions regarding the specific make up of BESS, Rosefield Substation and Internal Access tracks with regard to impermeable areas. To be picked up in surface water drainage design.	The LLFA supported the inclusion of SuDS features within ecological buffer strips to ensure surface water runoff is effectively captured and treated prior to entering adjacent watercourses. They also endorsed the sequential approach adopted in the drainage design and raised no objections to the proposed access track treatments, which include the use of matting for temporary tracks and graded surfaces for permanent ones. Additionally, the LLFA confirmed that ditches originating within the Site boundary could be incorporated into the drainage strategy, while those outside the boundary or receiving offsite flows may require further assessment.
	30 April 2025	Conference call with LLFA and the Applicant to discuss the provisional drainage strategy (specifically design parameters and requirements) for the Proposed Development. The LLFA queried methodology around greenfield runoff rates and suggested these are in line with IDB requirements.	The ODS was acceptable in principle to the LLFA in respect to main design parameters, such as the discharge rates and destinations, climate change values, the type of SuDS used and pollution control across the Proposed Development. Given that the drainage destinations were including the watercourses both under the LLFA and IDB jurisdiction, it was

Consultee	Date of engagement	Summary	Outcome of engagement
			agreed that a joint meeting with the IDB will be beneficial to agree a joint approach with respect to discharge rates.
	13 May 2025	Conference call with IDB, LLFA and the Applicant to discuss the provisional drainage strategy for the Proposed Development.	Further meeting including the LLFA and IDB to discuss the allowable discharge rates and agree the way they are calculated. LLFA was satisfied with the proposed approach and further discussions were continued with the IDB. Details are presented below.
Buckingham and River Ouzel IDB	17 April 2025	Surface water drainage enquiries sent to the LLFA to request information and discuss ODS proposals for Parcel 1 – 3.	Response to the enquiries was received on 13 May 2025 and is discussed below.
	13 May 2025	Conference call with IDB, LLFA and Applicant to confirm the requirement on the discharge rates, confirm the ownership of the waterbodies and design requirements from the IDB.	IDB provided a detailed response to the enquiries sent. This included information regarding maintenance, ownership, consenting and relevant fees to the IDB. IDB provided a document outlining their byelaws: Byelaws Made by The Buckingham and River Ouzel Internal Drainage Board Under

Consultee	Date of engagement	Summary	Outcome of engagement
			the Power and Authority Vested in Them by The Land Drainage Act 1991 with respect to various matters necessary for securing the efficient working of the drainage system of its Drainage District. IDB advised on Land Drainage Consent requirements. With respect to the ODS, IDB advised that runoff rates from the Proposed Development should be limited to 4 l/s per hectare of positively drained area. Detailed response to the queries raised is included in **Annex C**.
	5 June 2025	Post-meeting Follow-Up by Applicant to IDB: • Provided detailed drainage proposals for Parcels 1–3; • Parcel 1: 10% of total areas assumed as positively drained area; • Parcels 2 & 3: discharge based on impermeable areas only; and • Requested confirmation on approach and assumptions.	IDB responded on 9 June with the following notes: • Approach is acceptable in principle, pending detailed justification in ODS report; • Emphasised focus on positively drained areas and maintenance implications; and

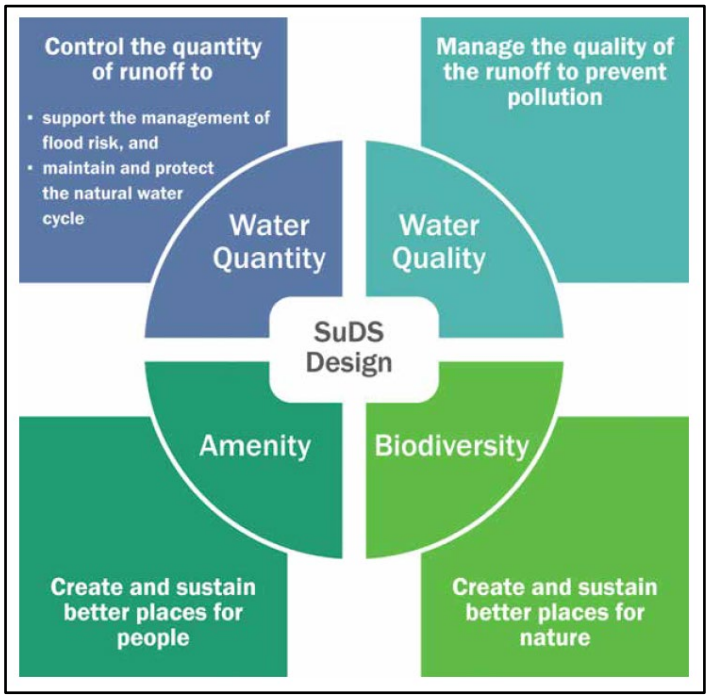
Consultee	Date of engagement	Summary	Outcome of engagement
			• Shared link to Surface Water Development Contribution (SWDC) policy.
	9 June 2025	IDB requested rationale for 25% climate change allowance.	Applicant confirmed 25% climate change allowance based on EA guidance for the 2070s epoch. IDB confirmed understanding and thanked for clarification.
	11 June 2025	Applicant raised further enquiries to confirm whether the IDB maintains a watercourse in the northwestern corner of Parcel 1.	IDB clarified that the watercourse near Calvert has not been maintained recently due to HS2/EWR works. No preferential bank exists for access, but a 3m buffer from bank top must be left for machinery access.
	12 June 2025	Applicant queried whether a section of watercourse in the northeast of Parcel 1 falls under IDB jurisdiction.	IDB confirmed the section is just outside the IDB district. However, because the downstream section is within the district, the Surface Water Development Contribution (SWDC) charge still applies.

4. Outline Drainage Strategy

4.1. Surface Water Collection Strategy

4.1.1. Best practice for drainage designs on new developments should prioritise SuDS solutions. SuDS aim to reduce flood risk by mimicking natural drainage processes and managing surface water runoff in a more sustainable way. The four pillars of SuDS — **Water Quantity, Water Quality, Amenity**, and **Biodiversity** — guide the design process to ensure multiple benefits are delivered. These are illustrated in **Figure 4.1**.

4.2. Figure 4.1 - The Four Pillars of SuDS (Source: CIRIA SuDS Manual C753)



4.2.1. The proposed drainage system is intended to comprise the following components:

- Source Control – Slowing and storing runoff as close to the source as possible.
- Interception - Capturing the first 5mm of rainfall from frequent, low-intensity events to prevent runoff and improve water quality.
- Infiltration – Allowing runoff to soak into the ground via swales, subject to local infiltration potential.

- Conveyance – Moving runoff across the site and between drainage components.
- Retention – Providing final storage prior to discharge into the existing network or watercourse.

4.3. SuDS Options

4.3.1. Following a review of the Site characteristics including local geology, hydrogeology and noting the likely low infiltration potential from the underlying soils, infiltration into the ground as a main surface water disposal method will be limited and therefore this is not considered as a primary means of surface water disposal for this Site.

4.3.2. All conveyance SuDS are proposed to be grassed to allow partial infiltration, subject to detailed design and geotechnical recommendations.

4.3.3. The following SuDS options are considered the most appropriate drainage components for the Proposed Development:

Conveyance SuDS - swales and cut-off ditches

4.3.4. These can be used in various locations across the Site, alongside the proposed access roads or to the perimeter of the PV areas. Cut-off ditches can be used to capture runoff from upstream catchments to the development parcels or the roads and convey to existing outfall locations.

4.3.5. A typical cross-section through a swale and cut-off ditch is presented in Drawing Ref. **Figure 3.13- Indicative Drainage Cross Sections** in **Annex E.**

Filter drains

4.3.6. Filter drains with a perforated pipe will be used across the areas surfaced with gravel substrate to collect and convey the flow into downstream receptors. Filter drains will offer filtration of runoff and pre-treatment of flow.

Ponds

4.3.7. Ponds will provide surface water attenuation following the capture of runoff from hardstanding areas. These will help to attenuate peak flows and reduce the discharge from these features whilst keeping surface water runoff above ground which assists with areas where outfall locations may be shallow ditches. The proposed ponds will enhance the biodiversity to the local area.

Bioretention Systems

4.3.8. Bioretention systems could be used locally alongside the access roads/within the car parking areas to capture the runoff from hardstanding areas where there are constraints for using swales. They could help to

reduce peak flows and volume of downstream components. Bioretention systems are flexible in shape and features and can be planned as landscaping features. Bioretention areas could also be used as an element for conveyance of the runoff.

Permeable Paving

4.3.9. If deemed feasible at detailed design, this SuDS element could provide an additional source control measure on site. Permeable paving may be implemented within the sections of parking/access routes. Detail design is subject to confirmed local infiltration potential and depth of the groundwater table. Under drained systems may need to be considered if ground conditions are not supportive to infiltrate into ground.

4.4. Design Parameters

4.4.1. In line with the IDB requirements, the runoff rate from the Proposed Development should be limited to 4l/s/ha from any positively drained area.

4.4.2. To account for long-term climate change impacts, the peak rainfall intensity for the 1 in 100-year storm event should be increased by 25%, as per the Environment Agency's current climate change allowances **[Ref. 20]**.

4.4.3. The expected design lifetime of the Proposed Development is 40 years. The central allowance for the 2070s epoch (developments with a lifetime between 2061 to 2125) for the Upper and Bedford Ouse Management Catchment, relevant to the Proposed Development location, has been applied.

4.4.4. This also follows the Planning Practice Guidance **[Ref. 19]** requirement to assess climate change for any non-residential developments over at least 75 years.

4.4.5. These parameters align with the guidance and expectations of the IDB and LLFA.

4.5. Drainage Hierarchy

4.5.1. Document H of the Building Regulations outlines a hierarchy for the discharge of surface water, promoting the adoption of Sustainable Drainage Systems (SuDS). According to this hierarchy, if surface water runoff is not being collected for reuse, it should be discharged to one of four options, with priority given to the highest method of discharge of the hierarchy. The suitability of these discharge options will be informed by a desk-based assessment, undertaken as part of this ODS. The hierarchy of options is as follows:

- Discharge into the ground (infiltration);
- Discharge to a surface water body;

- Discharge to a surface water sewer; and
- To a combined sewer where there are absolutely no other options and only where agreed in advance with the relevant sewerage undertaker.

4.5.2. The choice of system will be determined by local ground conditions (including groundwater levels).

4.5.3. Rainwater harvesting systems may be introduced across the BESS and Rosefield Substation facilities, where deemed feasible at detailed design.

Discharge into ground (infiltration):

4.5.4. As outlined in **Section 2.4**, the Proposed Development area is primarily underlain by Mudstone bedrock with limited superficial deposits recorded. The presence of clay deposits was confirmed during the on-site Ground Investigation (**ES Volume 4 - Appendix 11.3 - Ground Investigation Report [EN010158/APP/6.4]**). These ground conditions indicate poor natural infiltration potential.

4.5.5. According to Magic Map Soilscape mapping, the Site is underlain by 'slowly permeable seasonally wet loamy and clayey soils' and 'freely draining sandy breckland soils.'

4.5.6. Infiltration testing undertaken on-site confirmed very low infiltration potential, consistent with the presence of clay-rich soils.

4.5.7. While a shallow groundwater table is not generally anticipated, based on the ground investigation findings, locally, shallower groundwater levels may be expected near on-site watercourses.

4.5.8. Based on the above, infiltration is not considered a viable primary surface water disposal method for the Proposed Development. However, it is assumed that proposed SuDS features, such as swales, will be designed to promote partial infiltration where feasible.

Discharge to a surface water body:

4.5.9. Given the extensive network of local watercourses and field drainage ditches within and adjacent to the Site; discharge to these features is considered a feasible method of surface water disposal.

4.5.10. The proximity of the Site to existing watercourses will support managing runoff as close to its source as possible. A gravity connection to these features could be feasible, subject to the final design of the development platform levels within Parcels 2 and 3.

Discharge to a surface water sewer

4.5.11. Due to the rural nature of the site and the opportunity to prioritise discharge to adjacent water bodies, the discharge of surface water to a surface water sewer network is not being sought.

Discharge to a combined water sewer

4.5.12. Similarly, the discharge of surface water to a combined water sewer network is not being sought, and discharge into water bodies is a priority.

4.6. Surface Water Runoff Assessment

4.6.1. The pre-development / greenfield runoff rates have been calculated using the HR Wallingford UKSuDS greenfield runoff rate estimation tool and FEH22 rainfall data **[Ref. 32]** for an area of 1ha and are indicative only. These rates are presented in **Table 4.1** below with full calculations provided in **Annex D**.

4.7. Table 4.1 - Greenfield Runoff Rate Estimates

Return Period	Greenfield runoff rate (l/s/ha)
Q_{BAR}	4.7
1 in 1 Year	4.0
1 in 30 Year	10.7
1 in 100 Year	14.9

4.8. Post-Development Discharge Rates

4.8.1. As provided in **Table 4.1** above, the greenfield Qbar runoff is 4.7 l/s/ha. It has been requested by the IDB to limit surface water runoff to 4 l/s/ha from any positively drained areas following the Proposed Development.

4.8.2. The positively drained areas are defined by the IDB as “anywhere where water is collected, concentrated and then discharged via a node, usually a headwall or something similar.”

4.8.3. Relevant discussions with the IDB to agree the practical approach in relation to the positively drained areas for each development parcel are detailed in **Table 3-1** of this report. The approach is also agreed in principle with the LLFA.

5. Proposed Surface Water Discharge Strategy - Parcel 1

5.1.1. As part of Parcel 1 it is proposed to develop Solar PV modules and mounting structures with an associated network of access tracks. Equipment such as inverters, transformers, switchgear, equipment cabinets, acoustic fencing and cabling are also proposed as part of Parcel 1 works. A Satellite Collector Compound is proposed in Field B23 South.

5.1.2. Parcel 1 has been split into 24 subplots (Fields B1-B23 North and B23 South) across 183.0ha of the total area. Each subplot will be required to have their own surface water management measures, with the surface water drainage systems from individual plots interconnecting before discharging into a number of outfalls, located based on topography. The surface water network is proposed to manage surface water runoff arising from the access roads, the small areas occupied by the equipment and Satellite Collector Compound.

5.2. Discharge Rate

5.2.1. The majority of Parcel 1 would be managed using new swales and cut-off drainage channels at the edges of the new access tracks and low spots in individual solar farm parcels. The total estimated impermeable area for this parcel is approximately 6.0ha, which includes access tracks, areas associated with PV panel foundations (estimated at 1% of the total parcel area), equipment cabinets and the Satellite Collector Compound (field B23 South). The remaining 177.0ha out of 183.0ha will be drained at existing rates into existing field drains and via existing established outfall locations into local watercourses. This is not expected to increase runoff to local watercourses overall in accordance with findings from Hydrologic Response of Solar Farms **[Ref. 33]**.

5.2.2. Additionally, according to the principles of the BRE planning guidance for the development of large-scale ground mounted solar PV systems **[Ref. 34]**, solar panels do not increase the impermeable area of a site and it is generally considered that they do not contribute to an increase in surface water runoff from the Site.

5.2.3. As a conservative approach agreed with the LLFA and IDB, it is proposed to define the positively drained area for Parcel 1 as a maximum of up to 10% of the total parcel area (approximately 18.3ha). This figure captures both the expected hardstanding areas based on a reasonable worst case design and an additional 12.5ha of surrounding vegetated ground that may be expected to drain to the formal system.

5.2.4. Applying 4l/s/ha to this 18.3ha contributing area gives a total proposed discharge rate of 73.2l/s for Parcel 1.

5.3. Panel Design

5.3.1. It is anticipated that any precipitation falling on each solar panel will runoff the panels and flow towards the ground. Due to the existing geology on site, it is considered that there is a limited potential for the runoff to infiltrate into the ground.

5.3.2. The solar arrays are designed to be placed in rows with a minimum separation distance of 2.8m in between the leading edge of one row and the trailing edge of the row behind. The maximum separation between these rows will vary according to the ground elevation.

5.3.3. Where the panels are mounted in multiple horizontal rows this would be separated by a horizontal 'rainwater' gap. This gap will facilitate rainwater interception by vegetation and allow it to partially infiltrate and the remainder to flow overland across the ground surface between the panels, thereby replicating greenfield runoff conditions.

5.3.4. Currently, there are multiple types of foundation considered for the PV panel structures (helical or driven piles, or screw piles, or ballasted footings, or shallow concrete foundations). Subject to detailed design, the type of foundation will need to be considered in the drainage design. The design of the foundations should take into account local soil conditions and drainage patterns to ensure proper support and stability for the solar panels. Inadequate drainage around the foundations could lead to soil erosion or instability over time. The foundation structures have therefore been considered in the overall impermeability factor across the Parcel 1 catchment area (estimated at 1% of the total parcel area).

5.4. Vegetation and Soil Structure

5.4.1. Sustainable management of the post development situation in terms of vegetation planting and soil type can be used as a means of managing surface water runoff from the solar panels. As such to ensure that there is no increase in surface water runoff, managed sustainable vegetation (dripline planning) will be allowed to grow beneath the solar panels. This should avoid kinetic compaction and ensure that any potential instances of rivulet formation are minimised and surface water runoff flows over the ground in a natural way, as noted in the paper Hydrologic Response of Solar Farms **[Ref. 33]**. Vegetation planting and soil management should encompass all solar panel rows.

5.5. PV Access Tracks

5.5.1. It has been estimated that the proposed access tracks will introduce approximately 3.67 ha of impermeable areas.

5.5.2. As a worst-case scenario, this ODS assumes that the internal PV access tracks will be constructed of a Hydraulically Bound Mixture (HBM), consequently becoming impermeable. To manage surface water runoff, a network of road swales and cut-off ditches with check dams is proposed to intercept flows from the access tracks as well as any overland flow directed toward them. Further detail is provided in **Section 5.8**.

5.6. Balance of Solar System (BoSS) equipment

5.6.1. BoSS equipment is proposed in multiple locations along the access tracks within Parcel 1. For this assessment, the design rainfall event has been taken as the 6-hour, 1 in 100-year event, with the aim of retaining any additional runoff generated by the equipment within the available void space in the gravel subbase. This storage will be supported by natural evaporation. In the event of exceedance, swales proposed adjacent to the access tracks will provide additional capacity to manage any excess surface water runoff.

5.6.2. The equipment will introduce some impermeable areas which have been allowed within the anticipated impermeable area for Parcel 1.

5.7. Satellite Collector Compound

5.7.1. The Satellite Collector Compound proposed within Field B23 (South) will introduce some impermeable areas (0.25 ha), which have also been included in the total impermeable area for Parcel 1. SuDS will be prioritised and the required volume stored close to the source, via use of swales and attenuation features e.g. ponds, where feasible.

Storage Volume Requirements

5.7.2. As the Proposed Development will result in increased runoff, surface water attenuation will be required to control the post-development discharge to 4 l/s/ha.

5.7.3. The attenuation volume estimations for the in 100-year event with allowance for 25% climate change have been undertaken using the UKSuDS storage volume estimation tool. The calculations were populated with FEH22 Rainfall data and used the areas and discharge rates given in **Table 5.1**. Full calculations are provided in **Annex D**.

5.7.4. The volumes given below are indicative only, based on outline designs and are subject to change at detailed design stage.

5.8. Table 5.1 – Parcel 1 - Quick Storage Estimate Results

Total Area (ha)	Impermeable Area (%)	Contributing Catchment (ha)	Discharge Rate (l/s)	Indicative Storage Volume required for 100 year plus 25%CC (m^3)

183	10	18.3	73.2	13,258

5.8.1. A total storage volume of up to 13,258 m^3 is estimated to be required within Parcel 1 (see **Annex D**). The Outline Drainage Layout (**Drawing Ref: Outline Drainage Strategy Drawings, Annex E**) illustrates the proposed drainage catchments, receiving water bodies, and SuDS features that can accommodate this volume. The final layout is subject to further surveys at detailed design stage and any additional constraints present on site.

5.9. Surface Water Management

5.9.1. The principles for managing overland surface water runoff from the various catchments within Parcel 1 will follow the existing topography and natural drainage patterns, directing flows towards the nearby network of watercourses, consistent with the current watershed. Given the steep slopes within Parcel 1, it is assumed that gravity drainage will be achievable to the local open watercourses located around the site.

5.9.2. The surface water management strategy for Parcel 1 is based on managing runoff at source and incorporating sustainable drainage features in line with SuDS principles. The strategy includes a network of swales and cut-off ditches designed to intercept and attenuate overland flow, particularly around access tracks (See **Figure 5.1** and **Figure 5.2** below). Where necessary, new cut-off ditches may be introduced upstream of these tracks to maintain flow continuity and effectively manage surface water.

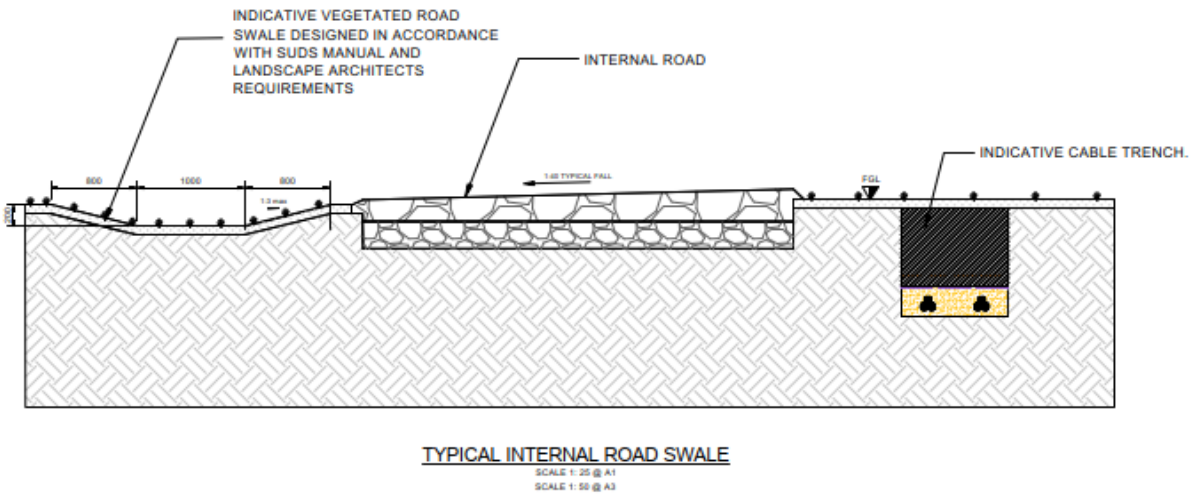
5.9.3. Swales adjacent to access tracks can provide both attenuation and water quality treatment, with features such as check dams to slow flow and promote partial infiltration. Limited culverting may be required to interconnect swales and cut off ditches within the sub-catchments (1A–1E). Existing land drains within fields may require local realignment to ensure continuity of site drainage.

5.9.4. Additional attenuation features, such as ponds, wetlands and bioretention areas are proposed at site boundaries in low-lying areas to intercept any offsite runoff and provide ancillary storage benefits. These features may offer supplementary volume retention in the event of exceedance in addition to the total storage proposed within the swales, cutoff ditches and existing watercourses within the site boundary. Opportunities to use permeable surfacing in certain locations will be explored at the detailed design stage to further reduce runoff and enhance water quality. Indicative locations of ponds are shown on the Outline Drainage Layout (**Drawing Ref: Outline Drainage Strategy Drawings, Annex E**) drawing and will be confirmed through detailed design and topographical survey.

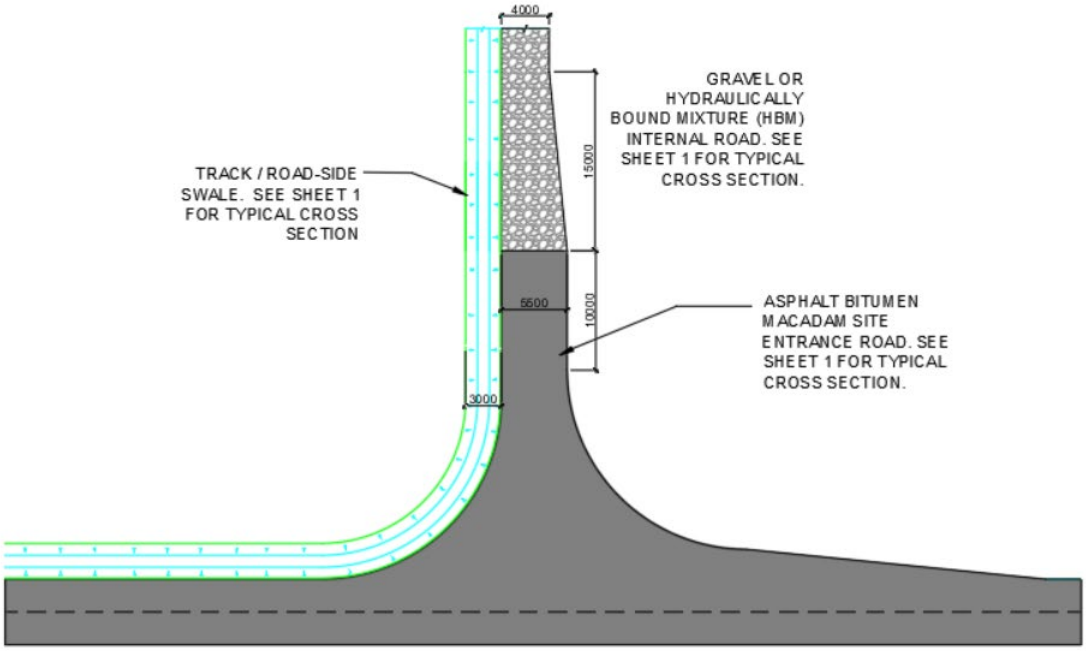
5.9.5. Effectively, the storage required for the 1 in 100-year storm event with allowance for 25% climate change allowance will be provided through a

combination of swales with check dams, cut-off ditches, existing drainage features and by integration with ecological mitigation areas, where SuDS ponds can be introduced.

5.10. Figure 5.1 - Typical Internal Road and Drainage Cross-section



5.11. Figure 5.2 - Typical Site Entrance Junction Plan



TYPICAL SITE ENTRANCE DRAINAGE PLAN

SCALE 1:200

5.12. Discharge Locations

5.12.1. It is proposed that surface water runoff from Parcel 1 could discharge by gravity into the onsite ordinary watercourse network as well as to the onsite field drainage network. The exact discharge locations will be confirmed following detailed topographical surveys and assessment of local constraints, including invert levels and capacities of the receiving water bodies.

5.13. Exceedance

5.13.1. Drainage exceedance occurs when the volume or rate of surface water runoff exceeds the capacity of the designed drainage system. This is expected during extreme rainfall events, such as those exceeding the 1 in 100-year storm event, inclusive of climate change allowances.

5.13.2. Recognising that it is neither economical nor sustainable to design underground drainage to accommodate all such extreme events, the proposed strategy incorporates multiple measures to manage exceedance flows safely on the surface and within the site boundary. Exceedance flows will be routed towards low-lying areas within the site that are capable of temporarily retaining additional volumes of water. The use of swales and cut-off ditches at each subplot level will help slow these exceedance flows

before they reach the downstream areas of the site and before discharge into the local watercourses. These areas include supplementary storage features, such as ponds, wetlands and bioretention areas which are integrated within the wider landscape to support the Proposed Development's overall mitigation and enhancement objectives. These features will be strategically located to intercept off-site runoff, provide ancillary storage and contribute to the overall resilience of the drainage strategy.

5.13.3. Where practicable, surface flows will be directed away from buildings and critical infrastructure using low-risk flow paths such as access roads and landscaped areas. The detailed design will also explore opportunities for permeable surfacing to reduce surface runoff volumes and support water quality improvements. Collectively, these measures form an integrated approach to managing exceedance within the Proposed Development.

6. Proposed Surface Water Discharge Strategy – Parcel 2

6.1.1. Parcel 2 covers a total area of 203.5ha and will be split into a number of subplots containing solar PVs, access roads, Satellite Collector Compound and BESS.

6.1.2. The BESS will be situated within Fields D8 and/or D9 and for the purposes of this assessment has been assumed to occupy a total area of 10.5ha (105,000m^2).

6.1.3. The drainage approach and design principles for the remaining wider areas of Parcel 2 (193ha) occupied by solar PVs will be in accordance with the drainage strategy presented for similar areas within Parcel 1. Therefore, this section presents the surface water drainage strategy for the BESS only.

6.1.4. The indicative BESS layout, as shown in the **Illustrative Layout Plans and Sections [EN010158/APP/2.6]**, has been used in this assessment. The BESS area will incorporate appropriate containment measures across the areas where batteries are concentrated to ensure a sealed and isolatable system that prevents any pathway for contamination of groundwater during a fire event, with the final specification of materials and configuration to be confirmed at detailed design stage (**Outline Battery Safety Management Plan [EN010158/APP/7.9.4]**).

6.1.5. As a reasonable worst case, 55% of the total BESS area has been assumed to be impermeable for the purposes of this ODS. Consequently, 57,225m^2 of the BESS total area may become impermeable and require drainage provision.

6.1.6. The majority of the BESS area, where hardstanding is not required, will be surfaced with a sub-base gravel layer.

6.2. Discharge Rate

6.2.1. For the BESS, the discharge rate has been calculated based on 4l/s/ha applied to the estimated impermeable area, which will be positively drained. The remainder of Fields D8 and D9 may be covered with granular strata and/or grass, which is expected to slow and intercept runoff through free voids.

6.2.2. Based on the proposed impermeable area of 5.72ha for BESS, a total discharge rate of 22.9 l/s is proposed for the BESS (Fields D8 and D9).

6.3. Storage Volume Requirements

6.3.1. Attenuation storage is required to ensure that post-development runoff rates comply with the discharge requirement of the IDB, as calculated above.

6.3.2. The attenuation volume estimations for the in 100-year event with allowance for 25% climate change have been undertaken using the UKSuDS storage volume estimation tool. The calculations were populated with FEH22 Rainfall data and used the areas and discharge rates given in **Table 6.1**. No allowance for urban creep has been assumed as a result of the development type. Full calculations are provided in **Annex D**.

6.3.3. The attenuation volumes given below are indicative only, based on outline designs and are subject to change at detailed design stage.

6.4. Table 6.1 – Parcel 2 Quick Storage Estimate Results (Fields D8, D9 only)

Name/ Field Ref	Total Area (ha)	Impermeable Area (ha)	Contributing Catchment (ha)	Discharge Rate (l/s)	Indicative Storage Volume required for 100 year plus 25%CC (m^3)
BESS/D8, D9	10.5	5.72	5.72	22.9	4,863

6.4.1. A total storage volume of up to 4,863 m^3 is estimated to be required within Fields D8 and D9 of Parcel 2 (see **Annex D**). The Outline Drainage Layout (**Drawing Ref: Outline Drainage Strategy Drawings, Annex E**) illustrates how the surface water drainage can be delivered to drain the BESS area, by giving indications of drainage catchments, receiving water bodies and SuDS features that can be used to accommodate the storage volume required.

6.4.2. Based on the nature of the proposals in Fields D8 and D9, the required attenuation volume can be achieved through a combination of open SuDS features, such as ponds and underground storage tanks. Where the use of open SuDS may be prevented during the operational phase of the development, underground storage options may offer a more practical solution. A proportion of the storage volume is assumed to be achieved within the free voids of the areas surfaced with sub-base gravel.

6.4.3. At detailed design stage and subject to confirmation of final ground levels within the BESS compound, the feasibility of gravity drainage will be reassessed. SuDS pond sizing will be refined accordingly and surface water pumping may be incorporated if deemed necessary.

6.5. Discharge Locations

6.5.1. It is proposed that surface water runoff from the BESS could discharge into the adjacent unnamed ordinary watercourse located to the south, as well as into the surrounding field drainage network. The exact discharge locations will be confirmed following detailed topographical surveys and assessment of local constraints, including invert levels and capacities of the receiving watercourses.

6.5.2. Discharge of surface water from the BESS into the local water bodies will also be controlled by an automatic system with manual backup and subject to adequate monitoring to ensure the discharge is restricted in the event of fire and during fire-fighting activities. An overview of the fire water management activities for the BESS is provided in the **Outline Battery Safety Management Plan [EN010158/APP/7.9]**.

6.6. Exceedance

6.6.1. Drainage exceedance occurs when the volume or rate of surface water runoff exceeds the capacity of the designed drainage system. This is expected during extreme rainfall events, such as those exceeding the 1 in 100-year storm event, inclusive of climate change allowances.

6.6.2. Recognising that it is neither economical nor sustainable to design underground drainage to accommodate all such extreme events, the proposed strategy incorporates multiple measures to manage exceedance flows safely on the surface and within the site boundary. Where practicable, exceedance flows can be routed along low-risk pathways, such as access roads and parking areas, and directed away from buildings and critical infrastructure into the proposed SuDS ponds and landscaped areas. These routes are intended to minimise the risk of flooding to critical infrastructure and to reduce potential hazards to site users and the environment.

6.6.3. Collectively, these measures form an integrated approach to managing exceedance within the development site.

6.7. Fire Water

6.7.1. The scope of this ODS report does not include a Fire Water Management Strategy. Firewater management for the BESS is covered in the **Outline Battery Safety Management Plan [EN010158/APP/7.9]**.

6.7.2. Detailed design of the fire water containment systems (including final specification of isolation controls, attenuation capacity, containment and discharge management) for the BESS and Rosefield Substation would be developed at a later stage as part of the Detailed Drainage Design in accordance with the site-specific Emergency Response Plan. This will include measures of the management of fire water during a thermal runaway or fire event and related water discharge activity permit requirements.

7. Proposed Surface Water Discharge Strategy – Parcel 3

7.1.1. Parcel 3 covers a total area of 50.6ha and will be split into a number of subplots containing solar PVs, access roads, Rosefield Substation and Main Collector Compound.

7.1.2. The Rosefield Substation and Main Collector Compound will occupy an area of up to 6ha and 2.5ha respectively (within Fields E11, E20, E21 and/or E22). This section presents the outline drainage strategy for the Main Collector Compound and Rosefield Substation only.

7.1.3. The drainage approach and design principles for the remaining wider areas of Parcel 3 (42.1 ha) occupied by solar PVs will be in accordance with the drainage strategy presented for similar areas within Parcels 1 and 2.

7.2. Main Collector Compound

7.2.1. The configuration of the Main Collector Compound is subject to optionality where Field E22 is the preferred location of the Main Collector Compound, but it may also be located in/across Fields E11, E20 and/or E21. In the context of this ODS, the Main Collector Compound is assumed to be located in Field E22. For the purposes of this assessment the Main Collector Compound has been assumed to occupy a total area of 2.5ha (25,000m2).

7.2.2. The indicative Main Collector Compound layout, as shown in the **Illustrative Layout Plans and Sections [EN010158/APP/2.6],** has been used in this assessment. Based on the expected construction characteristics for the Main Collector Compound and the mix between impermeable and permeable materials to be used, a reasonable worst case value of 50% of the total area has been assumed to be impermeable. This results in 1.25ha of impermeable area requiring drainage provision.

7.2.3. The remaining area is proposed to be finished with granular material and/or grass, which is expected to help slow, partially intercept and treat surface runoff through its free-draining voids.

7.3. Rosefield Substation

7.3.1. A new single Rosefield Substation would be located within Parcel 3 across Fields E11 and/or E20 within the northern part of the Parcel 3 area and south of the National Grid East Claydon Substation. For the purposes of this assessment the Rosefield Substation has been assumed to occupy a total area of 6ha (60,000m2).

7.3.2. Based on the expected construction characteristics for the Substation and the mix between impermeable and permeable materials to be used, a reasonable worst case value of value of 35% of total area has been

assumed to be impermeable. This results in 2.1ha of impermeable area requiring drainage provision.

7.3.3. Similar to the Main Collector Compound, the remaining area is proposed to be finished with granular material and/or grass, which is expected to help slow, partially intercept and treat surface runoff through its free-draining voids.

7.3.4. The surface water drainage associated with the Rosefield Substation will be designed to manage runoff from hardstanding and operational areas while minimising the risk of pollution to receiving water bodies. Drainage from areas associated with transformers and other electrical infrastructure will be routed via a contained drainage system incorporating appropriate pollution control measures, such as oil separation and interception, prior to discharge.

7.3.5. To manage emergency scenarios, including a transformer oil release or fire-fighting activities, provision will be made within the detailed drainage design to enable isolation of the Substation drainage where required.

7.3.6. If drainage isolation is activated, surface water and any potentially contaminated runoff would be retained on site to allow for inspection, testing and appropriate management prior to any discharge. The detailed specification, layout and operational procedures for the isolation and containment measures will be developed at detailed design stage, informed by the site-specific Emergency Response Plan and aligned with the principles set out in the **Outline Operational Environmental Management Plan [EN010158/APP/7.3.2] [REP1-080]** and **Outline Battery Safety Management Plan [EN010158/APP/7.9.2] [REP1-092]**..

7.4. Discharge Rates and Storage Volume Requirements

7.4.1. Attenuation storage is required to enable post-development runoff flows to be restricted to 4l/s/ha runoff rates, in accordance with the requirements of the IDB.

7.4.2. The following discharge rates have been derived from the estimated impermeable areas, which will be positively drained.

- 5.0l/s for Main Collector Compound
- 8.4l/s for Rosefield Substation

7.4.3. The attenuation volume estimations for the in 100-year event with allowance for 25% climate change have been undertaken using the UKSuDS storage volume estimation tool. The calculations were populated with FEH22 Rainfall data and used the areas and discharge rates stated above and summarised in **Table 7.1**. No allowance for urban creep has been assumed as a result of the development type. Full calculations are provided in **Annex**

D. The volumes given below are indicative only, based on outline designs and are subject to change at detail design.

7.5. Table 7.1 - Parcel 3 Quick Storage Estimate Results (Fields E22, E20, E11)

Name/ Field Ref	Total Area (ha)	Impermeable Area (ha)	Contributing Catchment (ha)	Discharge Rate (l/s)	Indicative Storage Volume required for 100 year plus 25%CC (m^3)
Main Compound/ E22	2.5	1.25	1.25	5.0	1,059
Substation/ E20, E11	6.0	2.1	2.1	8.4	1,793
Total	8.5	3.35	3.35	13.4	2,852

7.5.1. A total storage volume of up to 2,852 m^3 is estimated to be required across fields E22, E11 and E20 within Parcel 3 (see **Annex D**). The Outline Drainage Layout (**Drawing Ref: Outline Drainage Strategy Drawings, Annex E**) illustrates how the surface water drainage can drain the Rosefield Substation and Main Collector Compound, by giving indications of drainage catchments, receiving water bodies and SuDS features that can be used to accommodate the storage volume required.

7.5.2. The required storage volume can be achieved through a combination of open SuDS features, such as attenuation pond for Main Collector Compound and underground storage tanks primarily for Rosefield Substation. Underground options offer a more practical solution during the operation of the substation.

7.6. Discharge Locations

7.6.1. The Main Collector Compound and Rosefield Substation could discharge by gravity into the Buckingham and River Ouzel IDB maintained watercourse (Claydon Brook), located to the east of the development parcels. The exact discharge locations will be confirmed following detailed topographical surveys and assessment of local constraints, including invert levels and capacities of the receiving watercourses.

7.7. Exceedance

7.7.1. Drainage exceedance occurs when the volume or rate of surface water runoff exceeds the capacity of the designed drainage system. This is expected during extreme rainfall events, such as those exceeding the 1 in 100-year storm event, inclusive of climate change allowances.

7.7.2. Recognising that it is neither economical nor sustainable to design underground drainage to accommodate all such extreme events, the proposed strategy incorporates multiple measures to manage exceedance flows safely on the surface and within the site boundary. Where practicable, exceedance flows will be routed along low-risk pathways, such as access roads and parking areas, and directed away from buildings and critical infrastructure into the proposed SuDS ponds and landscaped areas. These routes are intended to minimise the risk of flooding to critical infrastructure and to reduce potential hazards to site users and the environment. Collectively, these measures form an integrated approach to managing exceedance within the Proposed Development.

7.8. Foul Drainage

7.8.1. It is anticipated that up to 24 permanent staff per day would be on-site during the operational (including maintenance) phase, with additional staff attending when required. Welfare facilities would be provided at the Rosefield Substation, BESS and Collector Compounds which will therefore require provision for domestic foul drainage. Three options for the operation (including maintenance) phase are outlined below:

- Option 1 – discharge to the local foul sewer network. Given the distance of the nearest sewer to the individual Parcels 1, 2 and 3, this is unlikely to be suitable.
- Option 2 - foul water drainage via a suitably designed package treatment plant located within the vicinity of the Rosefield Substation, BESS and Collector Compounds. Due to the nature of the Proposed Development, actual foul flows are likely to be small and as such a package treatment plant may be a viable approach with ultimate discharge of treated water towards the local ditch/watercourse network (if required via a field drain). This option will also be subject to the relevant discharge consents from the Environment Agency and will be confirmed at detailed design.
- Option 3 – foul/waste water stored in cesspits within the immediate vicinity of the welfare facility areas. The cesspits will be managed, inspected and drained by a licensed carrier who will then dispose of the waste offsite. The cesspits will either meet the general binding rules for the operation of a cesspit or the EA will be consulted to obtain a permit for the operation of the cesspits. Initial discussions have taken place with local recycling centres which currently look to have capacity to

accommodate this volume of foul/water. Further formal capacity checks will be carried out prior to construction.

7.8.2. The use of package treatment works or cesspits is subject to further development and would be outlined at detailed design.

8. Water Quality

8.1. Introduction

8.1.1. This section assesses the pollution risk associated with the operation (including maintenance) of the Proposed Development and sets out appropriate mitigation measures to protect receiving water bodies. It also evaluates the extent to which the proposed SuDS features within the surface water drainage network contribute to water quality improvement for the proposed permanent works.

8.2. Assessment Methodology

8.2.1. The SuDS Manual **[Ref. 22]** sets out a standard approach for managing the quality of surface water runoff, known as the Simple Index Approach. It defines the risk to the receiving environment as a function of:

- the pollution hazard associated with the site (i.e. the pollution source);
- the effectiveness of SuDS components in treating runoff and reducing pollutant levels to environmentally acceptable standards (i.e. the pollutant pathway); and
- the sensitivity of the receiving environment (the environment receptor).

8.2.2. The Simple Index Approach assesses SuDS components to determine whether selected arrangements of SuDS components and corresponding treatment trains provide a total pollution mitigation index at least equal to, or greater than, the pollution hazard index.

8.3. Key Pollution Sources

8.3.1. The following potentially polluting land uses have been assessed that may require discharge to a watercourse:

- Access tracks;
- Parking areas;
- Buildings;
- Bunds surrounding transformers and diesel generators;
- Transformers (with underground oil containment); and
- Emergency back-up diesel generators.

8.3.2. Two types of transformers are included as part of the Proposed Development. The transformers required for the Solar PV across Parcels 1, 2 and 3 and BESS in Parcel 2 will be small-scale units with sealed underground bund structures designed to store all oil in the event of a spill.

This will be then emptied when required and disposed of safely. These transformers are therefore excluded as a source of pollution and therefore do not require the Simple Index Approach assessment. As they are not proposed to be connected to the surface water drainage system, they are not expected to require special treatment for water quality.

8.3.3. The transformers required for the Rosefield Substation within Parcel 3 and Satellite Collector Compounds in Parcel 1 and 2 will be large-scale units, proposed to be installed within concrete bunds constructed on an impermeable base. A system will be in place to capture any oil pollution in the event of a leak or spillage, contain it within the bund before being removed by the onsite surface water drainage network via a full retention oil separator. An emergency back-up diesel generator is expected to be located at the Rosefield Substation and BESS. The generators will have similar pollution control arrangements in place as the transformers.

8.3.4. EDF Standard Technical Specification - Drainage and Water **[Ref 36]** outlines the following with respect to pollution control measures:

Oil Separators / Interceptors
Bunds will be provided to structures/foundations where any quantity of oil is stored (e.g. transformers, permanent storage areas etc.). Each bund shall have a holding capacity of at least 110% of the total oil volume (including header tank, where applicable) and shall prevent overflow.

Bunds shall be designed in accordance with the ER (EDF Renewables UK Employers requirements) documents, all relevant regulations/standards, the design risk assessment, and the requirements of plant/equipment suppliers, where applicable.

Bunds which may collect rainwater runoff shall be designed to separate oil and surface water runoff through a gravity separation system and not be reliant upon consumables such as filters. The bund design shall incorporate sumps and chambers to facilitate separation and removal of oil. Sensors shall be placed within the sump which send a signal to the SCADA system upon detection of oil. Alternatively, bunds may be fitted with a pump able to detect traces of oil. Under normal operating conditions the pump shall remove surface water from the bund and upon detection of oil, the pump shall shut-off and send a signal to the SCADA system.

Where discharge to surface water drains and/or watercourses has been permitted by the relevant Statutory Authority, the drainage system shall incorporate a |Full Retention (NS) Clas 1 separator unless otherwise agreed with the relevant Statutory Authority. The separator capacity shall be sufficient to retain the entire volume of any anticipated oil spill / leak. Of the separator incorporates an automatic closure device, it shall be fitted with an alarm/ warning system to alert the site operator when it is activated,

in order that immediate maintenance can be carried out. The alarm shall be activated when oil reaches 90% of the storage capacity. Where there is a risk of silt entering the separator, the build-up of silt shall not compromise the operation of the separator.

8.4. Simple Index Approach Assessment

8.4.1. Table 26.2 of the SuDS Manual C753 **[Ref. 22]** assigns pollution hazard indices for different land use classification, which is presented in **Figure 9.1** below.

8.5. Figure 9.1 - Table 26.2 of the SuDS Manual C753

TABLE 26.2 Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways[1]	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways[1]	High	0.8[2]	0.8[2]	0.9[2]

8.5.1. According to **Figure 6** above, all proposed access tracks and internal roads within Parcels 1 - 3 can be classed as *"low traffic roads with infrequent change i.e. < 300 traffic movements/day*". All parking areas can be classed as "*non-residential car parking with infrequent change i.e. < 300 traffic movements/day*". All buildings can be classed as "other roofs (industrial

roofs)". For those land uses the pollution hazard level is Low. All PV panel areas have also been deemed Low hazard areas in terms of pollution risk. Mitigation measures are required in accordance with the SuDS Manual C753 to reduce the relevant risk from the Total Suspended Solids (TSS), Metals and Hydrocarbons.

8.5.2. Due to the industrial character and activities associated the following parts of the Proposed Development are classed as "sites with heavy pollution" and "industrial site" with a High pollution hazard level, based on **Figure 6**:

- Rosefield Substation in Parcel 3;
- BESS compound* in Parcel 2, and
- Satellite Collector Compounds in Parcel 1 and Parcel 2.

*As the fire water is not intended to be released into the local watercourse network and is appropriately managed to ensure no pollution risk to the local environment, the assessment outlined in **Table 9.1** below therefore only accounts for pollution sources associated with the operation of the BESS under normal conditions (i.e. surface water runoff from general areas such as access tracks, car parking, building roofs). For the operation of the BESS in an emergency, such as during a fire event/leakage please refer to the **Outline Battery Safety Management Plan [EN010158/APP/7.9])**

8.5.3. The key pollution sources across the Rosefield Substation and Satellite Collector Compounds will be transformers and diesel generator. The key pollution source across BESS (excluding fire conditions) will be the diesel generator. All roads, buildings and car parking are assumed to have Low pollution hazard level, as discussed earlier.

8.5.4. Mitigation measures are required in accordance with the SuDS Manual C753 to mitigate both the Low and High risk. Additionally, the sites with High pollution hazard to the environment may require environmental licence or permit.

8.5.5. **Table 9.1** below provides a summary of the pollution hazard indices for different parts of the Proposed Development.

8.6. Table 9.1 – Summary of Pollution Hazard Indices (from SuDS Manual C753)

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
General areas, such as PV panels, access PV	Low	0.5	0.4	0.4

panels, access tracks, car parking, building roofs				
Rosefield Substation (E20, E11 - Parcel 3)	High	0.8	0.8	0.9
BESS (D17, D8 or D9)	High	0.8	0.8	0.9
Satellite Collector Compound (B23 South - Parcel 1, D17, D8 or D9 – Parcel 2)	High	0.8	0.8	0.9

8.6.1. Table 26.3 of SuDS Manual C753 gives the mitigation indices that refer to performance in pollutant removal by different treatment options / SuDS features. Those are outlined in **Table 9.2** below.

8.6.2. Where the mitigation index of an individual component is insufficient, two components (or more) in series will be required. A factor of 0.5 needs to be used to account for the reduced performance of secondary or tertiary components associated with already reduced inflow concentrations.

8.6.3. The simple index approach used to inform this ODS is presented in **Table 9.3** and **Table 9.4**.

8.7. Table 9.2 - Indicative SuDS Mitigation Indices for selected SuDS (from SuDS Manual C753)

Mitigation Indices			
Type of SuDS Component	**Total Suspended Solids (TSS)**	**Metals**	**Hydrocarbons**
Filter Drain	0.4	0.4	0.4
Attenuation Pond	0.7	0.7	0.5
Swale	0.5	0.6	0.6
Proprietary Treatment Systems - "Downstream Defender" by Hydro International (Mitigation	0.5	0.4	0.8

Index factors taken from manufacturers specification)			
Proprietary Treatment Systems – Full retention oil separator, e.g. SPEL Spillceptor (Mitigation Index factors taken from manufacturers specification)	Moderate removal (via silt trap chamber), typically 0.3-0.5	Partial removal (mainly particulate-bound metals), typically 0.3-0.5	c. 0.95-0.99

Low Hazard Areas

8.8. Table 9.3 - Treatment train for Low hazard areas (from SuDS Manual C753)

Simple Index Approach				
		TSS	**Metals**	**Hydrocarbons**
	Low Hazard Level Indices	0.5	0.4	0.4
Land Use	**Type of SuDS Component**			
Access tracks and solar PVs	Swale	0.5	0.6	0.6
	Total	**0.5**	**0.6**	**0.6**
Car parking	Filter drain	0.4	0.4	0.4
	Attenuation Pond x0.5	0.35	0.35	0.25
	Total	**0.75**	**0.75**	**0.66**
Building roofs	Filter drain	0.4	0.4	0.4

	Downstream Defender x0.5	0.25	0.2	0.4
	Total	**0.65**	**0.6**	**0.8**

8.8.1. The simple index approach has been used to inform this ODS and is presented in **Table 9.3** and **Table 9.4**. The mitigation indices stated in **Table 11** are halved for any interventions after the primary SuDS element, as required by the SuDS Manual.

8.8.2. As all access tracks have a low risk of pollution, adequate level of treatment will be provided for the surface water runoff through the swales (refer to **Table 9.3**).

8.8.3. Similarly for car parking areas and building roofs, adequate treatment will be achieved by the use of filter drains and attenuation ponds. These will be further supported by the use of proprietary treatment units e.g. downstream defender, which would particularly be applicable where the use of above-ground SuDS (e.g. swales, ponds) is limited.

8.8.4. It is not anticipated that the remaining areas, such as those surfaced with gravel sub-base, will include any oil-containing infrastructure. Therefore, these areas have not been included in the water quality assessment below.

High Hazard Areas

8.8.5. The following treatment train is proposed to all areas at High risk as outlined in Table 9.1 (refer to Table 9.4 below):

8.9. Table 9.4 - Treatment train for High hazard areas (from SuDS Manual C753)

		Simple Index Approach		
		TSS	**Metals**	**Hydrocarbons**
	High Hazard Level Indices	0.8	0.8	0.9
Key Pollutants	**Type of SuDS Component**			
Transformers & Diesel Generators (Substation, BESS, SCCs)	Containment/bund	1.0	1.0	1.0
	Oil separator x0.5	**0.15-0.25**	**0.15-0.25**	**0.5**

	Total	**>1.0**	**>1.0**	**>1.0**

8.9.1. The total mitigation indices for the High pollution hazard areas are 0.8, 0.8, 0.9 for the TSS, metals, and hydrocarbons, respectively. The simple index approach shows that the use of containment and oil separator is sufficient to meet the requirement for adequate pollution mitigation for the proposed transformers and diesel generators.

8.9.2. Any pollution associated with thermal runaway and fire water management activities are not intended for discharge into the watercourse network, therefore are not included in the simple index approach for subsequent on site treatment. Fire water management system including shutdown system, fire water tanks and telemetry will be used as described in the **Outline Battery Safety Management Plan [EN010158/APP/7.9]).**

8.9.3. The pollution prevention system will be designed in accordance with the Environment Agency's 'Pollution prevention for businesses' guidance **[Ref. 35]**, EDF Standard Technical Specification - Drainage and Water **[Ref. 36]**, BS EN 858 standards, and relevant Guidance for Pollution Prevention (e.g. GPP3 and GPP21) **[Ref. 37]** and include, but not be limited to, the following key elements:

- Oil separators;
- Shutdown system in form of automated penstock valves located upstream and downstream to each oil separator;
- Sampling chamber placed immediately downstream of every oil separator and at, or before the final discharge point to the watercourse; and
- Sump or a tank downstream of every oil separator.

8.9.4. This will ensure that the receiving waterbodies are protected from any negative impacts due to pollution as a result of the Proposed Development.

9. Management and Maintenance

9.1.1. The proposed surface water drainage system will be maintained in accordance with relevant design standards, such as Building Regulations Approved Document H and The SuDS Manual C753 **[Ref. 22].**

9.1.2. The operation and maintenance of the oil containment system, including oil separators, penstock valves, sumps and tanks, sampling chambers etc. will follow the guidelines set out in the CIRIA C736 'Containment systems for the prevention of pollution' and manufacturers' recommendations, as well as relevant Environment Agency pollution prevention guidance (e.g. Oil

storage regulations for businesses **[Ref. 38]**) **[Ref.35]**, ensuring the system remains effective and compliant with current environmental regulations.

9.1.3. Regular inspection and maintenance are required to ensure the effective long-term operation of SuDS and these requirements are detailed in The SuDS Manual C753. A typical SuDS maintenance inspection checklist in accordance with The SuDS Manual is provided in **Annex F**.

9.1.4. The general maintenance obligations associated with swales are included in Table 17.1 of the SuDS Manual. They include regular surface inspections for silting, removal of litter and managing vegetation and the inspection of inlets, outlets and overflows for silting/blockages.

9.1.5. The general maintenance obligations associated with filter drains are included in Table 16.1 of the SuDS Manual. They include regular inspections for the removal of litter/debris from the drained surface, access chamber and pre-treatment devices. They also include inspection/removal of debris from inlets/outlets, flow control systems, pre-treatment devices for blockages/siltation.

9.1.6. The general maintenance obligations associated with attenuation ponds are included in Table 23.1 of the SuDS Manual. They include regular activities, such as removal of litter/debris, grass cutting, inspection of vegetation, inspection of inlets, outlets, banksides as well as silt accumulation in any forebay and main body of the pond, occasional maintenance including sediment removal and remedial activities such as damage repair, replanting, aerating pond when signs of eutrophication are detected and structural repair.

9.1.7. The general maintenance obligations associated with proprietary treatment systems (e.g. oil separators, flow controls, downstream defender) are included in Table 14.2 of the SuDS Manual. They include routine inspections for the removal of litter/debris, sediment, oil, grease and floatables as well as the change of filter media. Also, the maintenance activities should be in line with the manufacturer's recommendations.

9.1.8. The surface water drainage network and any SuDS features will be maintained by the Applicant. Further details will be confirmed at detailed design stage.

10. Ordinary Watercourse Crossing and Consents

10.1. Crossings

10.1.1. **ES Volume 3, Figure 3.14: Indicative Watercourse and Ditch Crossing Locations [EN010158/APP/6.3]** indicates where proposed roads and cable routes/corridors will cross the existing watercourse network.

10.2. Easements

10.2.1. A 9m easement has been requested by the Internal Drainage Board (IDB) from any watercourses within their remit. The IDB has agreed to preferred access arrangements, which are detailed on a plan annotated by IDB and presented in **Annex C**. The IDB has also advised that the watercourse located in the northwestern corner of Parcel 1 (adjacent to Calvert village) can be maintained from either side and that adequate access allowance needs to be provided. In respect of the watercourse located in the northeastern corner of Parcel 1, the IDB confirmed it is not subject to their maintenance arrangements.

10.2.2. The Proposed Development will provide at least 10 metre offset from all existing ditches and ordinary watercourses except where access tracks and/or cable routes are required to cross an existing feature which is secured by the **Design Commitments [EN010158/APP/5.9].**

10.3. IDB Consents

10.3.1. The IDB advised on the requirement to obtain consents under Section 23 of the Land Drainage Act 1991 and the IDB's byelaws[1] made under Section 66 of the same Act. They also highlighted the associated maintenance charges[2] relevant to the Proposed Development.

10.3.2. The IDB confirmed that any discharge to, or development within 9m of, a watercourse under their jurisdiction is subject to IDB consent. This applies not only to hard engineering works but also to activities such as planting, fencing, and landscaping. Guidance on the consent application process has been provided by the IDB[3].

10.3.3. The requirement for IDB consents, as outlined above will be disapplied via the DCO process and is outside the scope of this report. Further details are included in the **Draft DCO [EN010158/APP/3.1].**

10.4. LLFA Consents

10.4.1. Similar to the IDB consents, the requirement for land drainage consent from the LLFA is also likely to be disapplied via the DCO. Further details are included in the **Draft DCO [EN010158/APP/3.1].**

10.5. Alterations to IDB Watercourses

[1] https://www.idbs.org.uk/wp-content/uploads/2021/07/bo_byelaws_final_sealed-defra-approved.pdf

[2] https://www.idbs.org.uk/wp-content/uploads/2025/04/development-control-charges-and-fees-2025-26.pdf

[3] https://www.idbs.org.uk/consent-planning/consent-application-guidance/

10.5.1. The Proposed Development is not expected to require alterations to the existing IDB-managed watercourse network, other than for the construction of new outfall structures from the drainage system.

10.6. Alterations to LLFA watercourses

10.6.1. It is anticipated that local alterations to existing drainage ditches within Parcels 1, 2, and 3 under the LLFA's remit may be proposed at the detailed design stage. These would aim to improve flow and enhance the capacity and performance of the watercourses.

11. Conclusions and Measures

11.1. Conclusions

11.1.1. The following conclusions have been made:

- Infiltration potential for surface water disposal into the ground is limited and a connection into the local watercourses/field drains is suitable to be utilised for the Proposed Development.
- The surface water drainage network could be achievable by gravity into the receiving water bodies. This will be confirmed at the detailed design stage.
- The runoff rate from the Proposed Development will be limited to 4l/s/ha from any positively drained area and the peak rainfall intensity for the 1 in 100-year storm event will be increased by 25% to account for long-term climate change impacts.
- Storage for the 1 in 100-year storm event with allowance for 25% climate change would be provided within the Order Limits of the Proposed Development.
- The estimated storage volumes would be accommodated for each catchment close to the source and within the Order Limits of the Proposed Development without increasing risk of surface water flooding elsewhere.
- The proposed drainage system could include components such as source control, interception, infiltration (partial infiltration assumed), conveyance and retention. Various SuDS options, including swales, cut-off ditches, filter drains, ponds, bioretention systems and permeable paving are considered appropriate for the Proposed Development.
- The SuDS components recommended in this strategy are flexible in shape and features and can be easily adapted to suit the development.

- The ODS for Parcel 1 provides the baseline approach for managing surface water runoff across PV panels and access tracks, which also informs the approach for Parcels 2 and 3, where relevant.
- The exceedance strategy addresses the management of surface water runoff during extreme rainfall events exceeding the 1 in 100-year storm event. Exceedance flows could be routed along low-risk pathways, such as access roads, or directed into local SuDS features and landscaped areas to minimize the risk of flooding to critical infrastructure and reduce potential hazards to site users and the environment.
- Adequate water quality could be achieved prior to discharge of surface water drainage into the local waterbodies. This can be achieved via the use of SuDS features, proprietary systems to tackle oil pollution risk as well as adequate fire water management to tackle heavy metal pollution from the BESS facility at source.
- Three options have been presented for foul drainage for the Proposed Development, including discharge into foul sewer network, package treatment works and cesspits. The final option will be outlined at detailed design.
- The combination of the surface water drainage strategy, the foul drainage options and fire water management measures will ensure that there is no flood risk and water quality impact on any receptors.

11.2. Measures

11.2.1. The following measures will be actioned and taken into account as appropriate at detailed drainage design:

- To inform the feasibility of gravity connections and to identify any constraints, the levels of the receiving watercourses and ditches will be confirmed through topographical surveys, river cross-section surveys and drainage connectivity surveys.
- To inform the detailed drainage design, site-specific ground investigation will be undertaken to confirm ground conditions including ground water levels at proposed storage locations. It will also include BRE Digest 365 infiltration testing to confirm soil permeability and suitability for infiltration-based SuDS across key locations in Parcel 1, 2 and 3 of the Proposed Development. As per paragraph 1.3.1 of this report, this ODS focuses solely on the permanent works during the operational phase of the Proposed Development.
- To help identify any potential utility clashes or constraints and ensure appropriate coordination during the detailed design stage, surveys will be undertaken to confirm the location, depth, and condition of existing underground services at proposed SuDS feature locations and along

the alignment of the drainage network. Utility mapping will include statutory undertaker records, ground-penetrating radar (GPR) and trial pits where required.

- To assess the presence of contaminants and confirm whether the excavated material is suitable for reuse in reprofiling, soil testing will be undertaken.
- The proposed surface water drainage system, including SuDS features, will be designed in accordance with Building Regulations Approved Document H and the CIRIA C753 SuDS Manual.
- To ensure that existing agricultural drainage arrangements are maintained, the detailed drainage design will not include any drainage measures that would alter existing surface water flows from Knowl Hill. Existing drainage pathways and flow regimes that supply Pond Farm and Knowl Hill Farm will not be impacted by the Proposed Development, and the detailed drainage design will be developed so that there is no reduction in the availability of water required for ongoing agricultural use as a result of the design.
- To ensure the consistent approach and compliance with other DCO documents, the detailed drainage design will be substantially in accordance with this document.

12. References

- **Ref. 1:** Land Drainage Act 1991. Available online: https://www.legislation.gov.uk/id/ukpga/1991/59
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- **Ref. 3:** Water Resources Act 1991. Available online: https://www.legislation.gov.uk/ukpga/1991/57/contents
- **Ref. 4:** The Floods Directive (Directive 2007/60/EC). Available online: https://eur-lex.europa.eu/eli/dir/2007/60/oj/eng
- **Ref. 5:** Retained EU Law (Revocation and Reform) Act 2023, UK Parliament, (c. 28). Available online: https://www.legislation.gov.uk/ukpga/2023/28
- **Ref. 6:** Environment Act 2021. Available online: https://www.legislation.gov.uk/id/ukpga/2021/30
- **Ref. 7:** Water Industry Act 1991, c. 56. Available online: https://www.legislation.gov.uk/ukpga/1991/56/contents
- **Ref. 8:** Water Industry Act 2003, c. 37. Available online: https://www.legislation.gov.uk/ukpga/2003/37/contents
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- **Ref. 10:** HM Government (2017) The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. Available online: The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017
- **Ref. 11**: HM Government (2010) Drainage and waste disposal: Approved Document H. Available online: Drainage and waste disposal: Approved Document H - GOV.UK
- **Ref. 12:** National Planning Policy Framework (2025) – Section 14 'Meeting the challenge of climate change, flooding and coastal change' available online: https://www.gov.uk/government/publications/national-planning-policy-framework--2
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https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5

- **Ref. 16:** Buckinghamshire Council (2021). Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan. Available online: https://buckinghamshire-gov-uk.s3.amazonaws.com/documents/Aylesbury_local_plan_L46JWaT.pdf
- **Ref. 17:** Buckinghamshire Council (2023). The Local Plan for Buckinghamshire. Available online: https://www.buckinghamshire.gov.uk/documents/27504/Draft_vision_and_objectives_2_1.pdf
- **Ref. 18:** Buckinghamshire Council (2022). Watercourse advice note (Aylesbury Vale area). Available online: Watercourse advice note (Aylesbury Vale area) | Buckinghamshire Council
- **Ref. 19:** HM Government (2022), Flood Risk and Coastal Change. Available online: Flood risk and coastal change - GOV.UK
- **Ref. 20:** Flood Risk Assessments: climate change allowances, Environment Agency, 2022. Available online: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances
- **Ref. 21:** Design Manual for Roads and Bridges LA 113 Road Drainage and the Water Environment (National Highways 2020). Available online: https://www.standardsforhighways.co.uk/tses/attachments/d6388f5f-2694-4986-ac46-b17b62c21727
- **Ref. 22:** The CIRIA SuDS Manual C753. Available online: https://www.susdrain.org/resources/SuDS_Manual.html
- **Ref. 23:** Local Authorities SuDS Officer Organisation (LASOO) Non-Statutory National Standards for Sustainable Drainage Systems (2015). Available online: https://www.susdrain.org/files/resources/other-guidance/lasoo_non_statutory_suds_technical_standards_guidance_2016_.pdf
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- **Ref 38:** Department of Environment, Food and Rural Affairs and Environment Agency. (2023). Oil storage regulations for businesses. Available online: https://www.gov.uk/guidance/storing-oil-at-a-home-or-business

Annex A
Zonal Masterplan and Illustrative Layout Plan



Rosefield Solar Farm

Illustrative Layout Plans and Sections

APFP Regulation Reg 5(2)(o)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

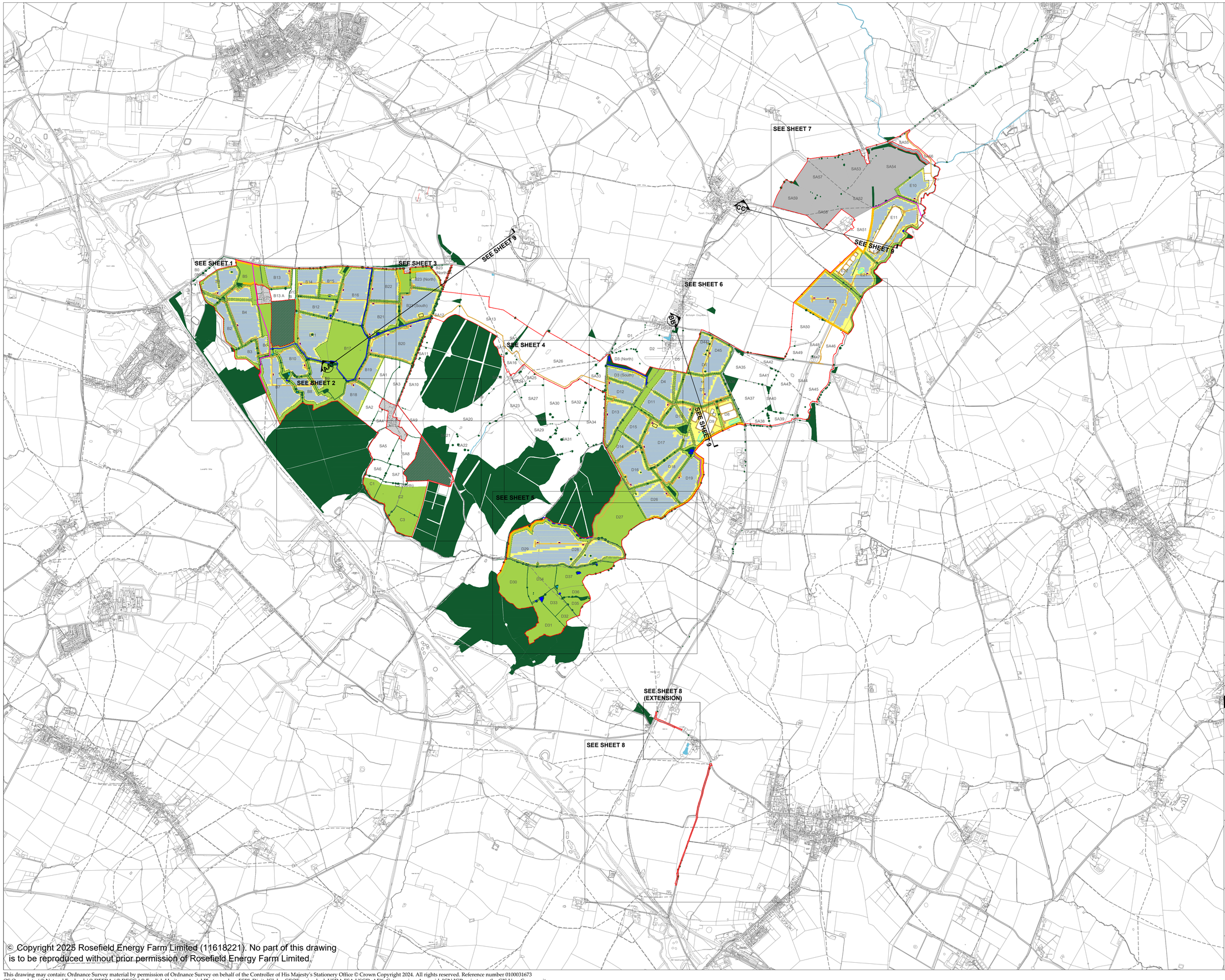
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September 2025

Rosefield Energyfarm Limited

2.6 Illustrative Layout Plans and Sections

Drawing number	Revision number	Drawing title	Scale
2.6	01	Illustrative Layout Plans and Sections – Key Plan	1:15,000 (Key Plan) @ A1
2.6	01	Illustrative Layout Plans and Sections – Sheet 1 of 9	1:2,500 (Key Plan) @ A1
2.6	01	Illustrative Layout Plans and Sections – Sheet 2 of 9	1:2,500 (Key Plan) @ A1
2.6	01	Illustrative Layout Plans and Sections – Sheet 3 of 9	1:2,500 (Key Plan) @ A1
2.6	01	Illustrative Layout Plans and Sections – Sheet 4 of 9	1:2,500 (Key Plan) @ A1
2.6	01	Illustrative Layout Plans and Sections – Sheet 5 of 9	1:2,500 (Key Plan) @ A1
2.6	01	Illustrative Layout Plans and Sections – Sheet 6 of 9	1:2,500 (Key Plan) @ A1
2.6	01	Illustrative Layout Plans and Sections – Sheet 7 of 9	1:2,500 (Key Plan) @ A1
2.6	01	Illustrative Layout Plans and Sections – Sheet 8 of 9	1:2,500 (Key Plan) @ A1
2.6	01	Illustrative Layout Plans and Sections – Sheet 9 of 9	As Shown @ A1



LEGEND:

- Order Limits
- Areas outside the Order Limits

Existing landscape features
- Existing vegetation (Trees and hedgerows)
- Existing watercourse
- Existing ponds (priority habitat)
- Existing ponds (non-priority habitat - potential to consider restoration and/or enhancement)

Proposed green and blue infrastructure
- Indicative area for mitigation and/or enhancement
- Indicative area for Solar PV and / or ancillary development, to include mitigation and enhancement under panels
- Indicative locations for strategic early planting / vegetation management
- Former ponds (non-priority habitat - potential to consider recreation)
- Indicative locations for proposed ecological pond

Existing routes
- Existing Public Right of Way
- Existing permissive footpath

Indicative proposed routes
- Proposed Public Right of Way Diversion
- Proposed permissive footpath

Proposed Solar Development Infrastructure
- Proposed internal access track
- Proposed Rosefield Substation and Main Collector Compound
- Proposed BESS Compound
- Proposed Satellite Collector Compound
- Proposed Solar PV modules and Inverter and Transformer Station

NOTE:

1. Ordnance Survey (OS) MasterMap data adopted as the drawing base map.
2. The location of features shown are indicative only. Exact locations to be confirmed on site.
3. Additional features may be present on site that have not been identified on the OS MasterMap data.
4. The Illustrative Layout demonstrates one way that the authorised development could be carried out within the constraints of the Control Documents contained within the DCO Application, however, consent is not sought for this layout.
5. The Illustrative Layout shows containerised ITS.
6. The Illustrative Layout covers both central and string inverter options (the difference would not be visible at the scale shown).
7. The Illustrative Layout shows the location of new internal access tracks required by the Proposed Development. The use of existing access tracks would also be required by the Proposed Development but these are not highlighted on the plan.
8. Underground features (such as cables), jointing bays, and boundary treatments (such as perimeter fencing and CCTV) are not shown.
9. The Illustrative Layout is drawn to OS MasterMap data and Land Registry boundaries. In some locations the Land Registry boundaries differ from the OS MasterMap data which results in Limits of Deviation and/or the Order Limits not aligning with the line work shown on the base map.
10. The Illustrative Layout demonstrates the Proposed Development at the operational phase only. Where no features of the Proposed Development are shown within a field, either the field is not utilised beyond the construction phase or only below ground features would be present. These areas would be returned to existing uses.

REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
01	SEPT 2025	DCO SUBMISSION	LDA	LDA	EDF

Rosefield Solar Farm

DOCUMENT:

APPLICATION DRAWINGS
NOT FOR APPROVAL

REGULATION 5(2)(o)

DRAWING TITLE:

ILLUSTRATIVE LAYOUT PLANS & SECTIONS - KEY PLAN

PIN REFERENCE NUMBER:	REVISION:
EN010158/APP/2.6	01

DATE:	DRAWN:	SCALE:
SEPT 2025	LDA	1:15,000 at A1

SCALE BAR: 0 1km

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B0 (East)

B0 (West)

Calvert Way

B1

B2

B3

B4

B5

B6

B7

B8

B9

B10

B11

B12

B13

B13 A

B13 B

B14

B15

B16

B17

B18

B19

B21

B22

SA1

SA2

P1

P2

P4

SEE SHEET 3

SEE SHEET 2

1. Refer to key plan for notes.

LEGEND:

- Order Limits
- Areas outside the Order Limits

Existing landscape features
- Existing vegetation (Trees and hedgerows)
- Existing watercourse
- P1 Existing ponds (priority habitat)
- P2 Existing ponds (non-priority habitat - potential to consider restoration and/or enhancement)

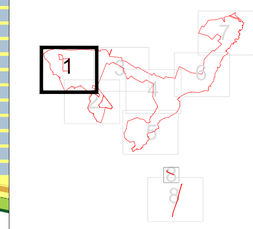
Proposed green and blue infrastructure
- Indicative area for mitigation and/or enhancement
- Indicative area for Solar PV and / or ancillary development, to include mitigation and enhancement under panels
- Indicative locations for strategic early planting / vegetation management
- P3 Former ponds (non-priority habitat - potential to consider recreation)
- P4 Indicative locations for proposed ecological pond

Existing routes
- Existing Public Right of Way
- Existing permissive footpath

Indicative proposed routes
- Proposed Public Right of Way Diversion
- Proposed permissive footpath

Proposed Solar Development Infrastructure
- Proposed internal access track
- Proposed Solar PV modules and Inverter and Transformer Station

KEY PLAN:



REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
01	SEPT 2025	DCO SUBMISSION	LDA	LDA	EDF

Rosefield Solar Farm

Rosefield Solar Farm

DOCUMENT:
APPLICATION DRAWINGS
NOT FOR APPROVAL

REGULATION 5(2)(o)

DRAWING TITLE:
ILLUSTRATIVE LAYOUT PLANS AND SECTIONS - SHEET 1 OF 9

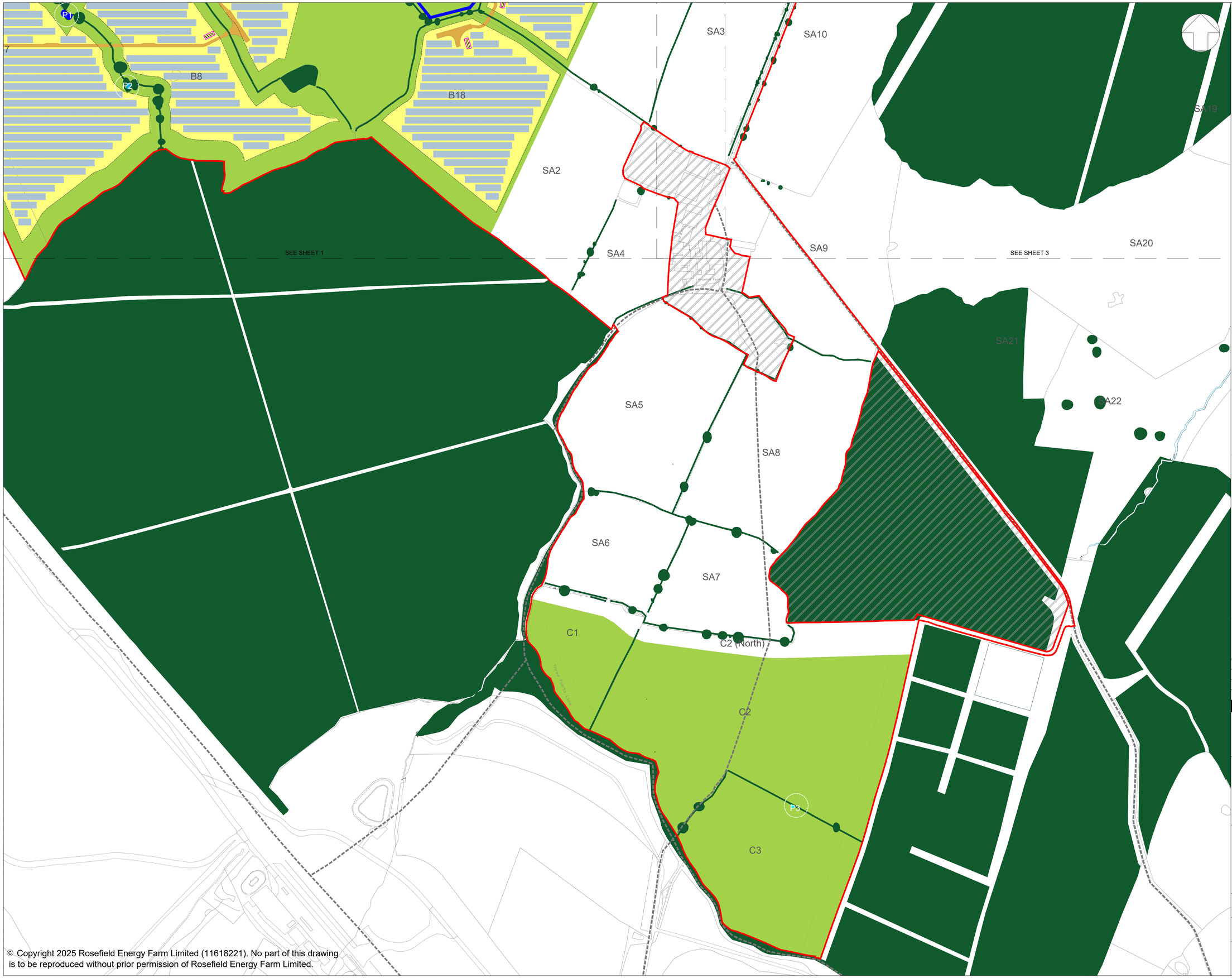
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EN010158/APP/2.6	01

DATE:	DRAWN:	SCALE:
SEPT 2025	LDA	1:2,500 at A1

SCALE BAR:
0 100m

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LEGEND:

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- Areas outside the Order Limits

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- Indicative area for Solar PV and / or ancillary development, to include mitigation and enhancement under panels
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- P4 Indicative locations for proposed ecological pond

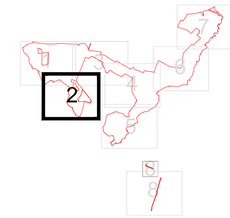
Existing routes
- Existing Public Right of Way
- Existing permissive footpath

Indicative proposed routes
- Proposed Public Right of Way Diversion
- Proposed permissive footpath

Proposed Solar Development Infrastructure
- Proposed internal access track
- Proposed Solar PV modules and Inverter and Transformer Station

1. Refer to key plan for notes.

KEY PLAN:



REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
01	SEPT 2025	DCO SUBMISSION	LDA	LDA	EDF

Rosefield Solar Farm

Rosefield Solar Farm

DOCUMENT:
APPLICATION DRAWINGS
NOT FOR APPROVAL

REGULATION 5(2)(o)

DRAWING TITLE:
ILLUSTRATIVE LAYOUT PLANS AND SECTIONS - SHEET 2 OF 9

PIN REFERENCE NUMBER:	REVISION:
EN010158/APP/2.6	01

DATE:	DRAWN:	SCALE:
SEPT 2025	LDA	1:2,500 at A1

SCALE BAR:

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B23 (North) A

B23 (North)

B23 (South)

Proposed Satellite Collector Compound

P2

SEE SHEET 1

B20

SA11

Three Points Lane

SA12

SA13

SA14

SA15

SA16

SA17

SA18

SA19

SA20

SA3

SA10

SA9

SA23

SA24

SA25

SA26

SA27

SA28

SA30

SA32

SEE SHEET 2

SEE SHEET 4

Blacknore Hill Farm Cottages

Catherine

South Lodge

LEGEND:

- Order Limits
- Areas outside the Order Limits

Existing landscape features
- Existing vegetation (Trees and hedgerows)
- Existing watercourse
- P1 Existing ponds (priority habitat)
- P2 Existing ponds (non-priority habitat - potential to consider restoration and/or enhancement)

Proposed green and blue infrastructure
- Indicative area for mitigation and/or enhancement
- Indicative area for Solar PV and / or ancillary development, to include mitigation and enhancement under panels
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- P3 Former ponds (non-priority habitat - potential to consider recreation)
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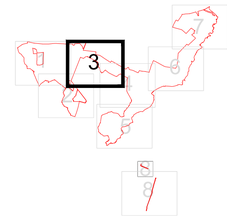
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REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
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Rosefield Solar Farm

DOCUMENT:
APPLICATION DRAWINGS
NOT FOR APPROVAL

REGULATION 5(2)(o)

DRAWING TITLE:
ILLUSTRATIVE LAYOUT PLANS AND SECTIONS - SHEET 3 OF 9

PIN REFERENCE NUMBER: EN010158/APP/2.6

REVISION: 01

DATE: SEPT 2025

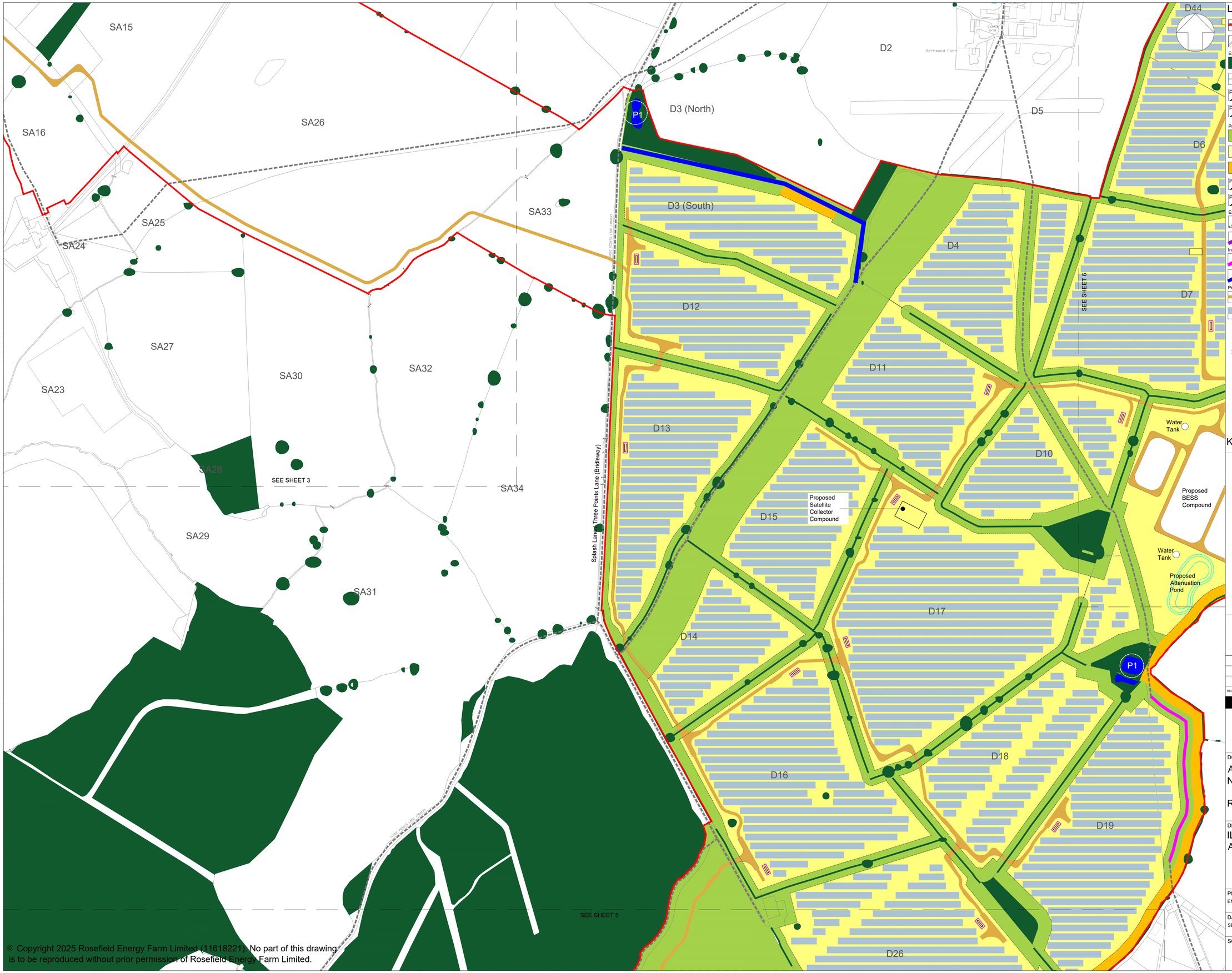
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SCALE: 1:2,500 at A1

SCALE BAR: 0 100m

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LEGEND:

- Order Limits
- Areas outside the Order Limits

Existing landscape features
- Existing vegetation (Trees and hedgerows)
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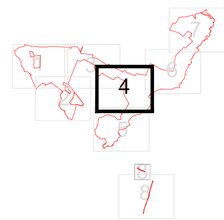
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1. Refer to key plan for notes.

KEY PLAN:



REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
01	SEPT 2025	DCO SUBMISSION	LDA	LDA	EDF

Rosefield Solar Farm

Rosefield Solar Farm

DOCUMENT:
APPLICATION DRAWINGS
NOT FOR APPROVAL

REGULATION 5(2)(o)

DRAWING TITLE:
ILLUSTRATIVE LAYOUT PLANS AND SECTIONS - SHEET 4 OF 9

PIN REFERENCE NUMBER:	REVISION:
EN010158/APP/2.6	01

DATE:	DRAWN:	SCALE:
SEPT 2025	LDA	1:2,500 at A1

SCALE BAR:
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SEE SHEET 4

D26

D27

D29

D28

D30

D34

D37

D36

D33

D35

D32

D31

P1

P2

Points Lane

Dry Leys Farmhouse

The Cottage

Tank

CD

Cattle Grid

LEGEND:

- Order Limits
- Areas outside the Order Limits

Existing landscape features
- Existing vegetation (Trees and hedgerows)
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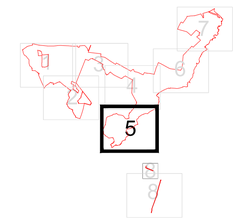
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Rosefield Solar Farm

Rosefield Solar Farm

DOCUMENT:

APPLICATION DRAWINGS
NOT FOR APPROVAL

REGULATION 5(2)(o)

DRAWING TITLE:

ILLUSTRATIVE LAYOUT PLANS AND SECTIONS - SHEET 5 OF 9

PIN REFERENCE NUMBER:	REVISION:
EN010158/APP/2.6	01

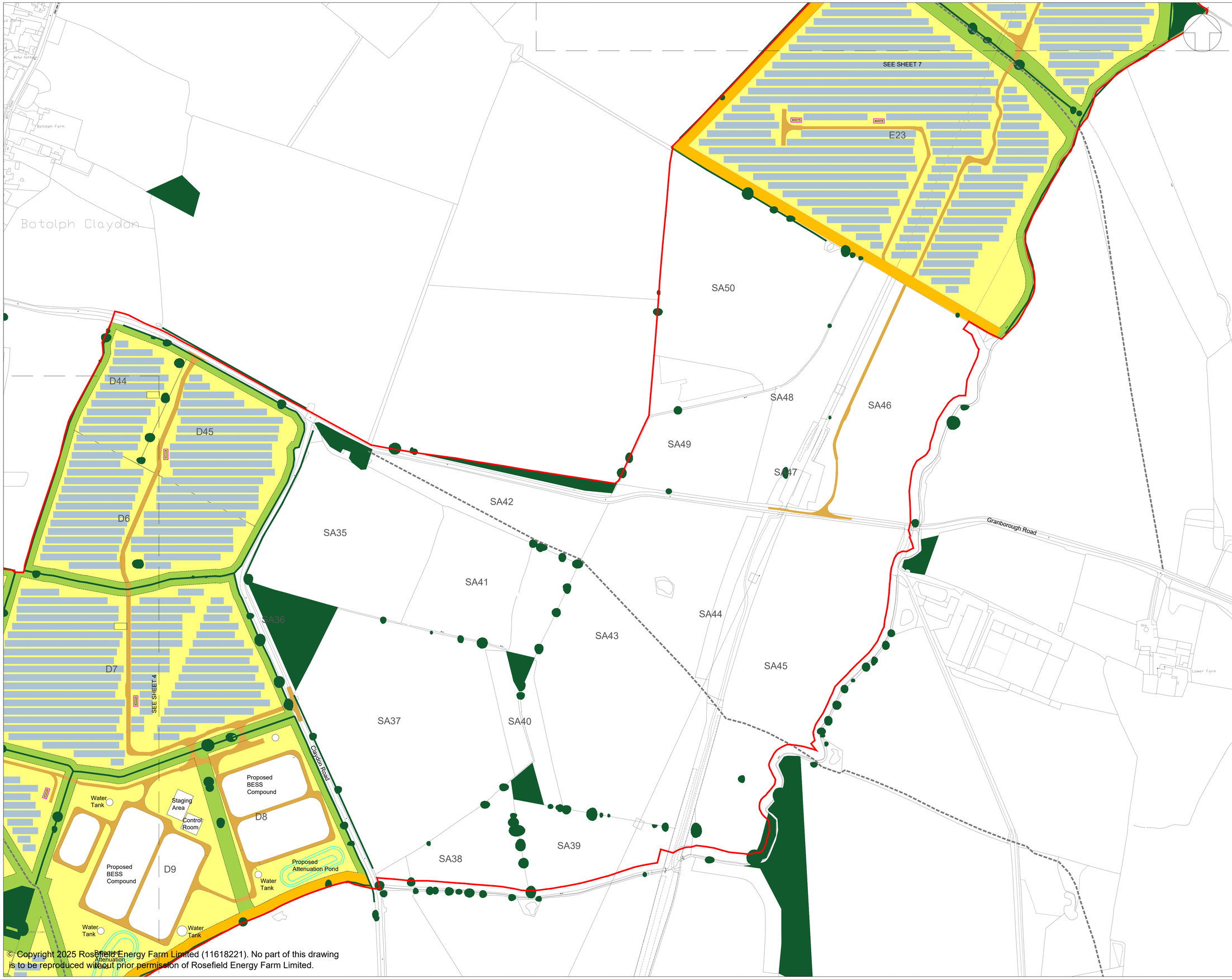
DATE:	DRAWN:	SCALE:
SEPT 2025	LDA	1:2,500 at A1

SCALE BAR:

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LEGEND:

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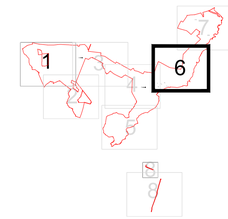
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1. Refer to key plan for notes.

KEY PLAN:



REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
01	SEPT 2025	DCO SUBMISSION	LDA	LDA	EDF

Rosefield Solar Farm

Rosefield Solar Farm

DOCUMENT:
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REGULATION 5(2)(o)

DRAWING TITLE:
ILLUSTRATIVE LAYOUT PLANS AND SECTIONS - SHEET 6 OF 9

PIN REFERENCE NUMBER:	REVISION:
EN010158/APP/2.6	01

DATE:	DRAWN:	SCALE:
SEPT 2025	LDA	1:2,500 at A1

SCALE BAR:
0 100m

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SA55

SA56

East Claydon Substation

SA54

SA53

National Grid East Claydon Substation

SA57

SA59

SA52

SA58

SA51

E10

E11

E20

E22

E21

Proposed Rosefield Substation

P1

Proposed Main Collector Compound

Proposed Attenuation Pond

SEE SHEET 6

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LEGEND:

- Order Limits
- Areas outside the Order Limits

Existing landscape features
- Existing vegetation (Trees and hedgerows)
- Existing watercourse
- P1 Existing ponds (priority habitat)
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Proposed green and blue infrastructure
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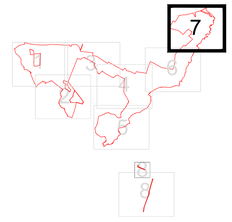
Existing routes
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Indicative proposed routes
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- Proposed permissive footpath

Proposed Solar Development Infrastructure
- Proposed internal access track
- Proposed Solar PV modules and Inverter and Transformer Station

1. Refer to key plan for notes.

KEY PLAN:



REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
01	SEPT 2025	DCO SUBMISSION	LDA	LDA	EDF

Rosefield Solar Farm

Rosefield Solar Farm

DOCUMENT:
APPLICATION DRAWINGS
NOT FOR APPROVAL

REGULATION 5(2)(o)

DRAWING TITLE:
ILLUSTRATIVE LAYOUT PLANS AND SECTIONS - SHEET 7 OF 9

PIN REFERENCE NUMBER: EN010158/APP/2.6

REVISION: 01

DATE: SEPT 2025

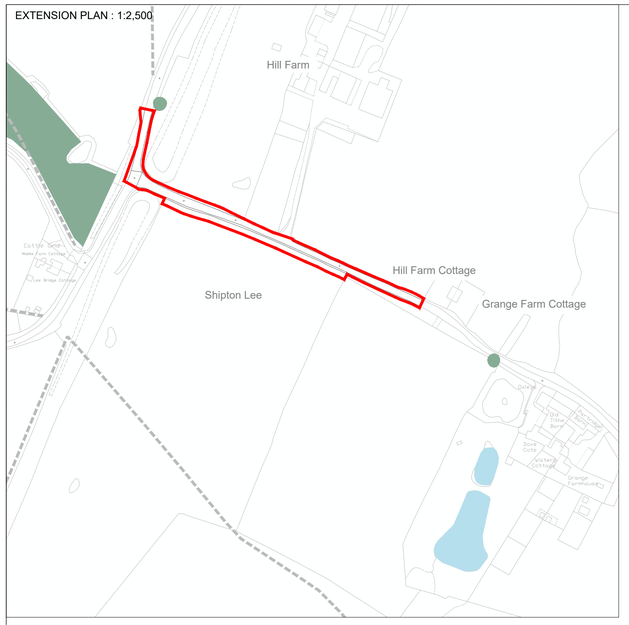
DRAWN: LDA

SCALE: 1:2,500 at A1

SCALE BAR:

0 100m

EXTENSION PLAN : 1:2,500



SEE EXTENSION PLAN

Railway Cottage

Harpers House

Fieldside Farm

Lee Road

Sports Pavilion

Playing Field

Townsend

LEGEND:

- Order Limits
- Areas outside the Order Limits

Existing landscape features
- Existing vegetation (Trees and hedgerows)
- Existing watercourse
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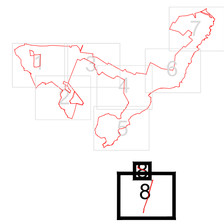
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1. Refer to key plan for notes.

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01	SEPT 2025	DCO SUBMISSION	LDA	LDA	EDF

Rosefield Solar Farm

DOCUMENT:
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REGULATION 5(2)(o)

DRAWING TITLE:
ILLUSTRATIVE LAYOUT PLANS AND SECTIONS - SHEET 8 OF 9

PIN REFERENCE NUMBER: EN010158/APP/2.6

REVISION: 01

DATE: SEPT 2025

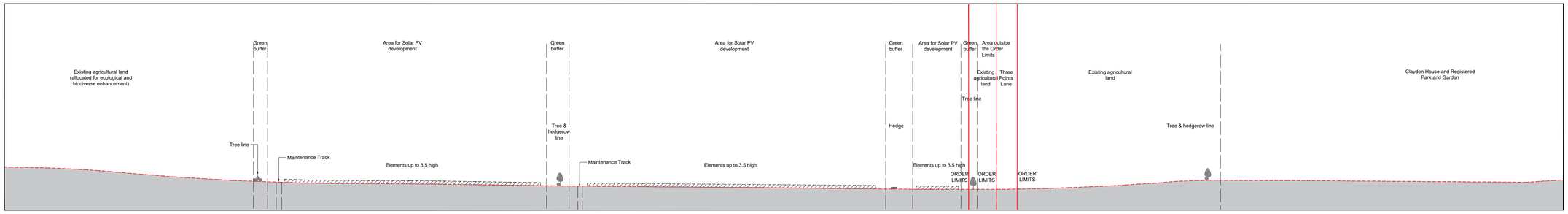
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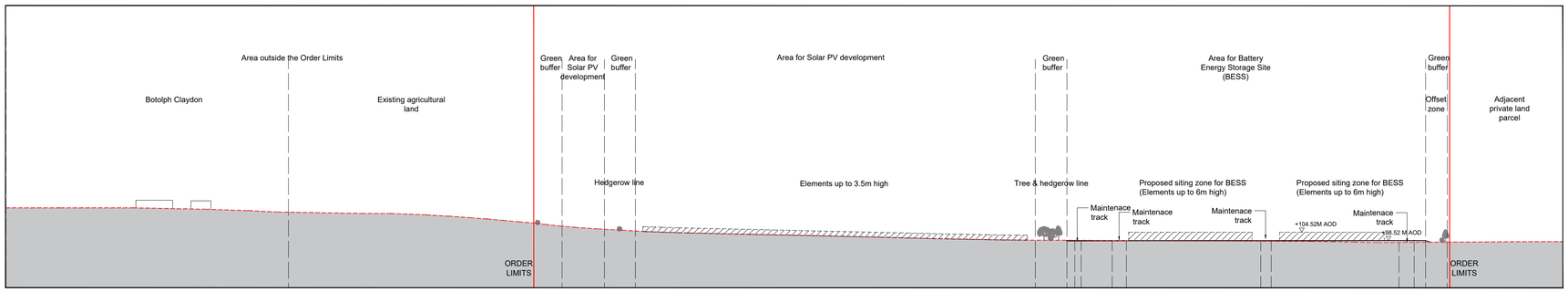
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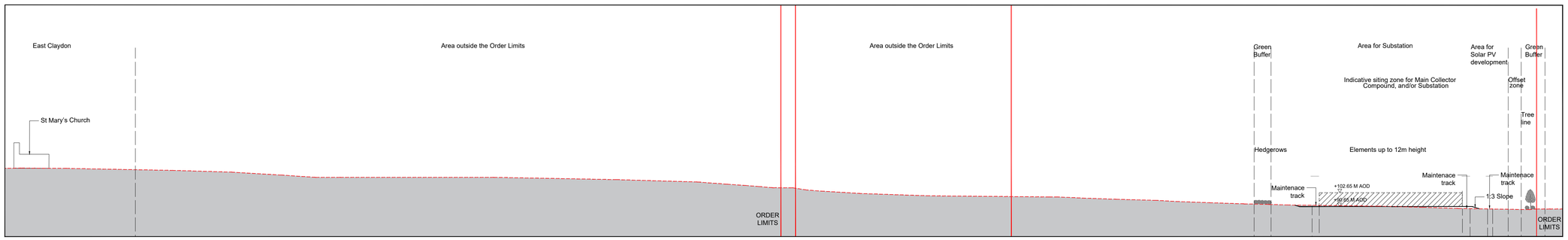
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Section A-AA - Scale 1:2500



Section B-BB- Scale 1:2000



Section C-CC - Scale 1:2000

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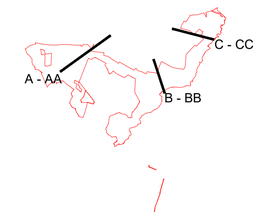
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LEGEND:

- Order Limits
- Existing Ground Level
- Proposed Finished Platform Level

1. Refer to key plan for notes.

KEY PLAN:



REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
01	SEPT 2025	DCO SUBMISSION	LDA	LDA	EDF

Rosefield Solar Farm

DOCUMENT:
APPLICATION DRAWINGS
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REGULATION 5(2)(o)

DRAWING TITLE:
ILLUSTRATIVE LAYOUT PLANS AND SECTIONS - SHEET 9 OF 9

PIN REFERENCE NUMBER: EN010158/APP/2.6

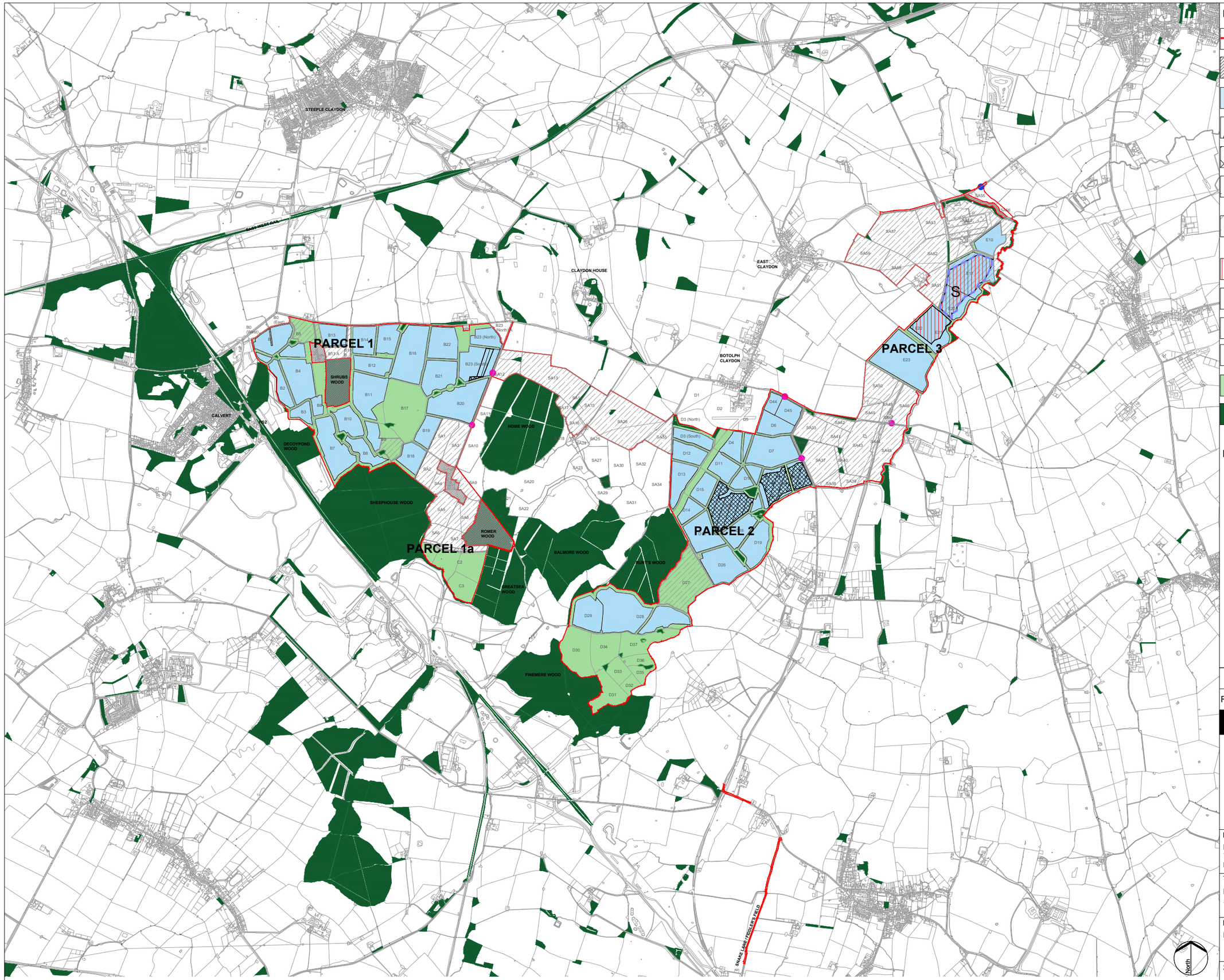
REVISION: 01

DATE: SEPT 2025

DRAWN: LDA

SCALE: As Shown at A1

SCALE BAR:
0 100m



KEY:

- Order Limits
- Areas outside the Order Limits
- Proposed area for Solar PV development
- Proposed siting zone for Satellite Collector Compounds
- Proposed siting zone for Satellite Collector Compounds Transformers
- Proposed siting zone for BESS
- Area for underground cable routes and/or access tracks (locations to be determined) Grid connection corridor may include above-ground infrastructure within the National Grid East Claydon Substation
- Proposed siting zone for Main Collector Compound
- Proposed siting zone for Rosefield Substation
- Indicative site access location from public highway
- Indicative access location for abnormal indivisible loads (AIL) from public highway
- Proposed area for mitigation and/or enhancement
- Existing Woodland

NOTES:

1. The location of features shown are indicative only. Exact locations to be confirmed on site.
2. Additional features may be present on site that have not been identified on the topographical plan.
3. Parameter plan drawings are based on OS MasterMap information.
4. The following components are not shown on the parameter plan drawings within fields where solar PV development or other associated infrastructure is proposed: internal cable route corridors, boundary fencing and CCTV, inverter and transformers and switchgear compounds, internal access tracks, drainage, construction access and compounds.
5. Offsets from the outermost overhead transmission line and from the base of the transmission towers will be applied when the revised alignment of overhead lines is finalised by National Grid.

REV	Date	Description	Drn	Chk	App
01	SEPT 2025	DCO SUBMISSION	LDA	LDA	EDF

Rosefield Solar Farm

DOCUMENT:
ENVIRONMENTAL STATEMENT
VOLUME 3: FIGURES
REGULATION 5(2)(a)

TITLE:
FIGURE 3.5
ZONAL MASTERPLAN

PINS REFERENCE NUMBER:
EN010158/APP/6.3

SCALE : 1:30,000 @ A3
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REV: 01

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Annex B
Site Information



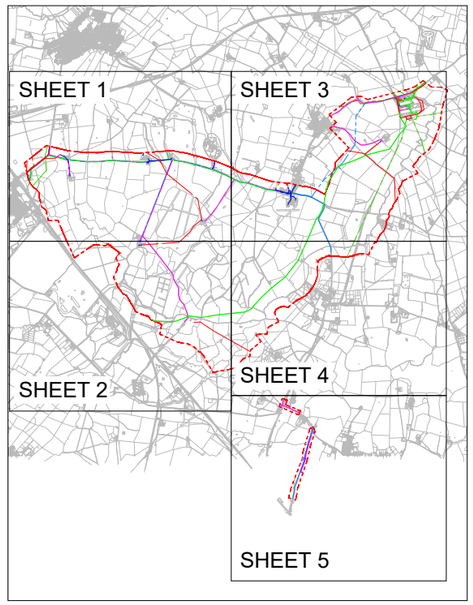
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COLT	COLT	KPN	KPN
CITYFIBRE	CITY FIBRE	LAST MILE	LAST MILE
CSP FIBRE	CSP FIBRE	LON UND	LU POWERLINK
LV ELEC	LV ELEC	NGFIBRE	NG FIBRE
HV ELEC	HV ELEC	LUMEN	OCU LUMEN
EHV ELEC	EHV ELEC	SEARCH AREA	SEARCH AREA
ES PIPELINES	ES PIPELINES	SEWER FW	SEWER FW
EU NETWORKS	EU NETWORKS	SEWER SW	SEWER SW
EXA	EXA	SEWER COM	SEWER COM
FULCRUM	FULCRUM	BSKYB	SKY
GAMMA	GAMMA	TATA	TATA
LP GAS	GAS - LP	TFL	TFL
MP GAS	GAS - MP	VERIZON	VERIZON
IP GAS	GAS - IP	VIRGIN	VIRGIN
HP GAS	GAS - HP	VODAFONE	VODAFONE
GTC	GTC ELECTRIC	WATER	WATER
GTG	GTC GAS	ZAYO	ZAYO
GTT	GTT	GIGACLEAR	GIGACLEAR

LINES MAY INDICATE MULTIPLE CABLES

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01	Sept 25	DCO SUBMISSION	JR	CC	JH

Rosefield Solar Farm

DOCUMENT:
ENVIRONMENTAL STATEMENT
VOLUME 3: FIGURES
REGULATION 5(2)(a)

TITLE:
FIGURE 5.1 - DESK - BASED STUDY OF EXISTING UTILITIES
SHEET 5 OF 5

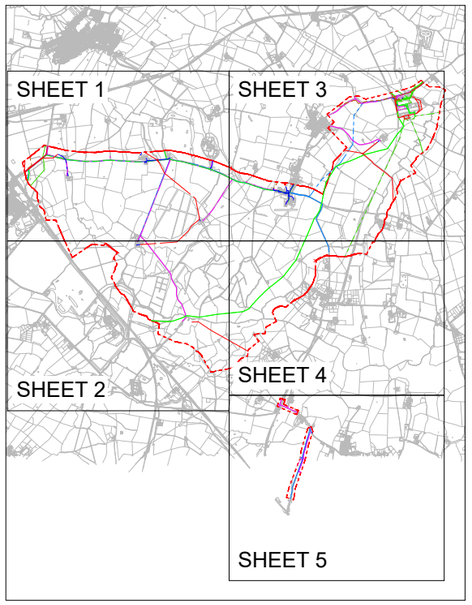
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HV ELEC	HV ELEC
EHV ELEC	EHV ELEC
ES PIPELINES	ES PIPELINES
EU NETWORKS	EU NETWORKS
EXA	EXA
FULCRUM	FULCRUM
GAMMA	GAMMA
LP GAS	GAS - LP
MP GAS	GAS - MP
IP GAS	GAS - IP
HP GAS	GAS - HP
GTC	GTC ELECTRIC
GTG	GTC GAS
GTT	GTT
G.NET	G NETWORK
KCOM	KCOM
KPN	KPN
LAST MILE	LAST MILE
LON UND	LU POWERLINK
NGFIBRE	NG FIBRE
LUMEN	OCU LUMEN
SEARCH AREA	SEARCH AREA
SEWER FW	SEWER FW
SEWER SW	SEWER SW
SEWER COM	SEWER COM
BSKYB	SKY
TATA	TATA
TFL	TFL
VERIZON	VERIZON
VIRGIN	VIRGIN
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Rosefield Solar Farm

DOCUMENT:
ENVIRONMENTAL STATEMENT
VOLUME 3: FIGURES
REGULATION 5(2)(a)

TITLE:
FIGURE 5.1 - DESK - BASED STUDY OF EXISTING UTILITIES
SHEET 1 OF 5

PINS REFERENCE NUMBER:
EN010158/APP/6.3

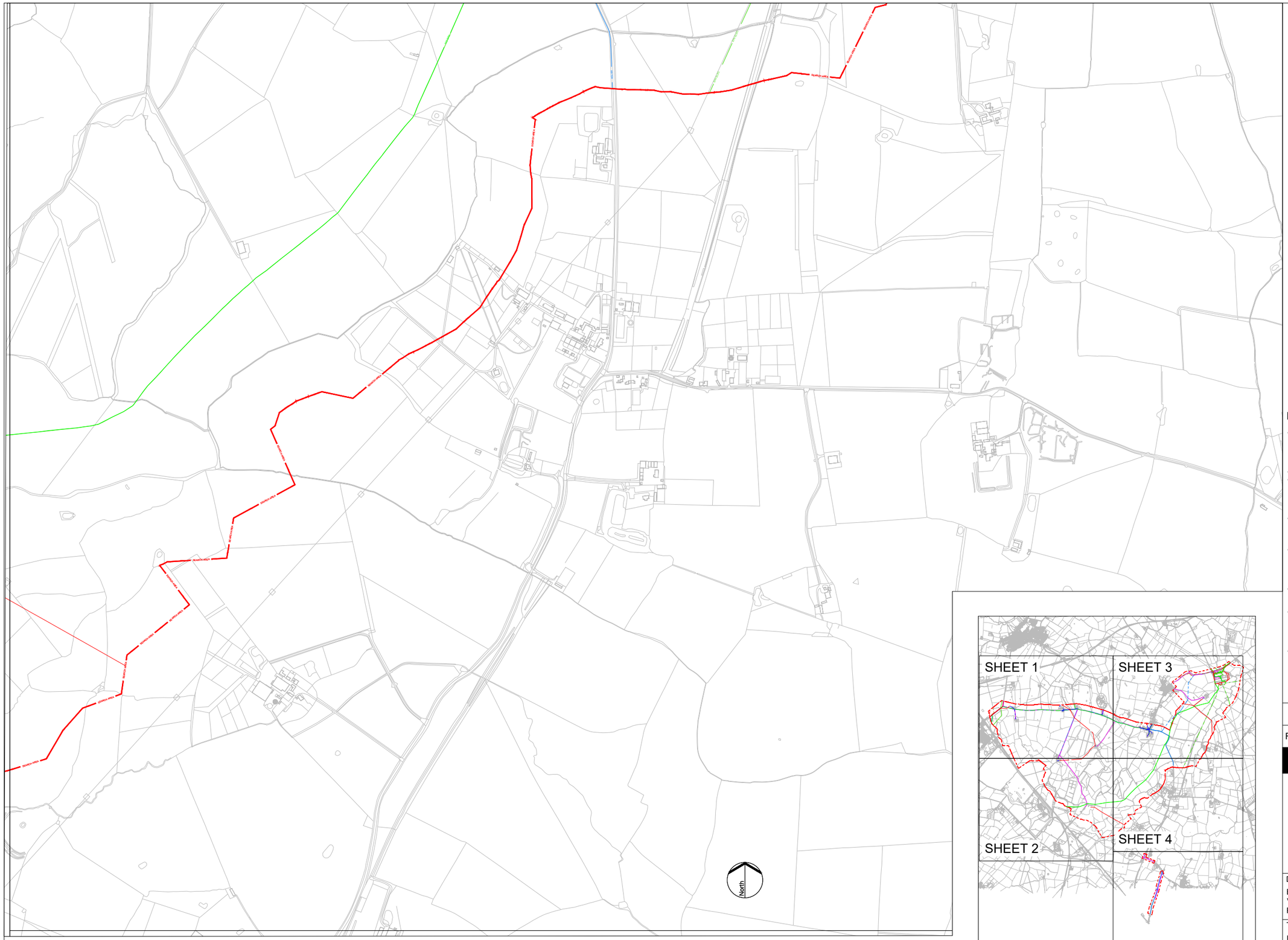
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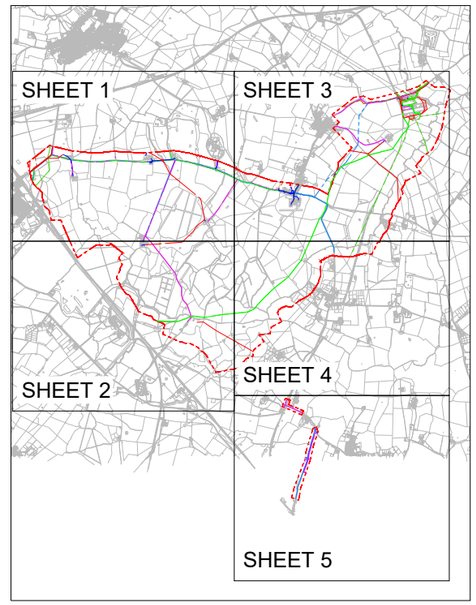
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North

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EHV ELEC	EHV ELEC	SEARCH AREA	SEARCH AREA
ES PIPELINES	ES PIPELINES	SEWER FW	SEWER FW
EU NETWORKS	EU NETWORKS	SEWER SW	SEWER SW
EXA	EXA	SEWER COM	SEWER COM
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Rosefield Solar Farm

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ENVIRONMENTAL STATEMENT
VOLUME 3: FIGURES
REGULATION 5(2)(a)

TITLE:
FIGURE 5.1 - DESK - BASED STUDY OF EXISTING UTILITIES
SHEET 4 OF 5

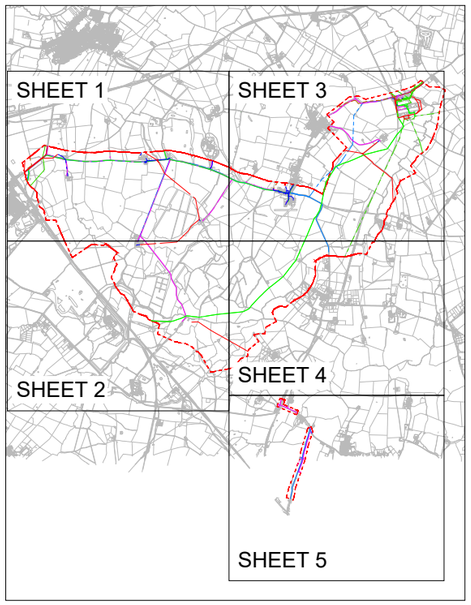
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SHEET 3 OF 5

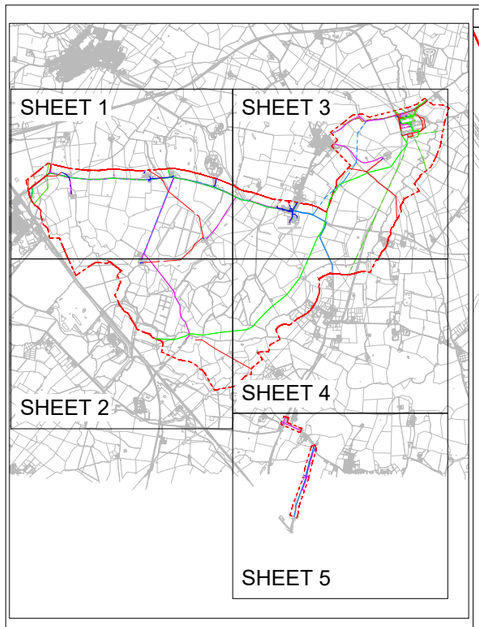
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TITLE:
FIGURE 5.1 - DESK - BASED STUDY OF EXISTING UTILITIES
SHEET 2 OF 5

PINS REFERENCE NUMBER:
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Annex C
Consultee Correspondence



[redacted]

From: [redacted]@idbs.org.uk>
Sent: 09 June 2025 15:12
To: [redacted]
Cc: [redacted]@buckinghamshire.gov.uk; [redacted]
Subject: RE: Rosefield Solar Farm (DCO) - Drainage Strategy Enquiry

Thanks [redacted]
I thought this might be the case, but I have to ask!
Scott

[redacted]
Senior Engineer

Bedford Group of Drainage Boards | Vale House | Broadmead Road | Stewartby | Bedfordshire | MK43 9ND

Tel: 01234 767995 | www.idbs.org.uk

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From: [redacted]@wsp.com>
Sent: 09 June 2025 15:09
To: [redacted]@idbs.org.uk>
Cc: [redacted]@buckinghamshire.gov.uk; [redacted]@wsp.com>; [redacted]@wsp.com>; [redacted]@rsk.co.uk>; [redacted]@edf-re.uk>; [redacted]@edf-re.uk>
Subject: RE: Rosefield Solar Farm (DCO) - Drainage Strategy Enquiry

Good Afternoon, [redacted]

Thank you for your reply.

With regard to climate change, we follow the Environment Agency's guidance on climate change allowances for the Upper and Bedford Ouse Management Catchment.

Given the proposed development's design lifetime of up to 50 years, we have assessed the central allowance for the 2070s epoch, which corresponds to a 25% climate change allowance.

Best regards,
[redacted]

[redacted]
Senior Flood Risk & Drainaqe Consultant
Water Risk Management & Engineering

8 First Street
Manchester
M15 4RP

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Registered office: WSP House, 70 Chancery Lane, London, WC2A 1AF.

From: [redacted]@idbs.org.uk>
Sent: 09 June 2025 09:57
To: [redacted]@wsp.com>
Cc: [redacted]@buckinghamshire.gov.uk; [redacted]@wsp.com>; [redacted]@wsp.com>; [redacted]@rsk.co.uk>; [redacted]@edf-re.uk>; [redacted]@edf-re.uk>
Subject: RE: Rosefield Solar Farm (DCO) - Drainage Strategy Enquiry

Hello [redacted]

I hope the summary below makes sense.

The way we look at drainage in terms of contribution to watercourse flow is simpler than HR Wallingford suggest. Part of the reason for this is that we don't account for interflow and recharge based on natural processes such as rainfall infiltration on vegetated ground finding its way over time into a watercourse. It would be impractical for us to do so, and contrary to the general principles of land drainage, in that we exist so that people can work their land, whether it be for crops, animal

husbandry or simple drainage of developed sites. What we are interested in is does any proposed man-made drainage scheme show likelihood of detriment (to the site owner, someone upstream or downstream, or the local environment), and is a proposed scheme likely to cause us to have to undertake more maintenance to maintain the status quo.

This is why we are interested in positively drained areas, i.e. anywhere where water is collected, concentrated and then discharged via a node, usually a headwall or something similar. This is of course a straightforward matter for, say, a car park, but less so for field. Your model, which you'll have to present when applying for consent therefore will have to show how you've come up with the figure you're presenting. Thus, in principle I'll say what you're presenting seems sensible but I will have to see the detail to be sure. As you've said, generally accepted convention is that solar farms don't have much effect on drainage as stormwater infiltrates, but this is not always the case and is geology dependent. As the area, I think, is a mix of mudstone and clay your conservative approach appears reasonable.

Summary and answer to your queries:

1. In principle yes, provided your calculations can justify this. At consent application time a technical note with a few words as an accompaniment too will be helpful.
2. As above.
3. Is there a reason for the 25% CC proposal, e.g. has this been directed by the EA / DEFRA as part of the DCO discussions, or is there some other reason (land use type etc.) that means the site is acceptable to fall into the 25% boundary and not the 40% boundary?
4. In principle yes. If you're catching, collecting, concentrating and discharging from a node to a watercourse and all other water is percolating and infiltrating like a natural field then this is acceptable.

I've included a link below to our SWDC policy on charges for sites as a reminder. The rates are reassessed by the Board every year and usually rise in keeping with inflation. The current rate for sticking to 4 l/s/ha is £1.71 / m^2.

https://www.idbs.org.uk/wp-content/uploads/2025/04/development-control-charges-and-fees-2025-26.pdf

Note for reference later that when it comes to paying for consents etc. the consent charges are payable via BACS or cheque only, while we issue an invoice for the SWDCs. I cannot change this I'm afraid, and it relates to how the charges are generated plus how we must deposit and report monies to government.

Thanks,

[redacted]
Senior Engineer

Bedford Group of Drainage Boards | Vale House | Broadmead Road | Stewartby | Bedfordshire | MK43 9ND

Tel: 01234 767995 | www.idbs.org.uk

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From: [redacted]@wsp.com>
Sent: 05 June 2025 14:51
To: [redacted]@idbs.org.uk>
Cc: [redacted]@buckinghamshire.gov.uk; [redacted]@wsp.com>; [redacted]@wsp.com>; [redacted]@rsk.co.uk>; [redacted]@edf-re.uk>; [redacted]@edf-re.uk>
Subject: RE: Rosefield Solar Farm (DCO) - Drainage Strategy Enquiry

Good afternoon, [redacted]

Following our Teams meeting on13th May, and as discussed, we are providing further information regarding the proposed drainage strategy for Parcels 1, 2 and 3 of the Rosefield Solar Farm.
Apologies for the delay in providing this update. Due to annual leave and the half-term period, we were unable to progress work on the project as planned.

As noted previously, the IDB requirement is to limit surface water runoff to **4 l/s/ha** from any **positively drained areas.**

Parcel 1
The majority of Parcel 1 will be managed using new swales and cut-off drainage channels at the edges of the new access tracks and low spots in individual the solar farm parcels. The proposed **impermeable area** for this parcel is **11.3 ha**, which includes access tracks and areas associated with PV panel foundations (estimated at 1% of the total parcel area). The remaining **208.4 ha** will direct existing flows via a mixture of **new cut-off ditches and existing field drains** into existing established outfall locations into local watercourses. This is not

expected to increase runoff to local watercourses overall in accordance with findings from Hydrologic Response of Solar Farms (Cook and McCuen 2013).

Before proposing the current strategy, as requested in our meeting, we ran a series of calculations assessing the runoff and storage requirements for different percentages of positively drained extents, as suggested during the meeting – **see Table 1 attached**. Options based solely on impermeable area or broader catchments resulted in disproportionately large storage volumes, which were deemed unsuitable and unachievable on the site given the slopes and the low-intensity land use. Based on this, we propose to define the positively drained area for Parcel 1 as **10% of the total parcel area (22 ha)**. This figure captures both the 11.3 ha of hardstanding and additional 10.7 ha of surrounding vegetated ground that is assumed to drain to the formal system.

Applying 4 l/s/ha to this 22 ha contributing area gives a total **proposed discharge rate of 87.8 l/s**. For preliminary storage calculations, we have used the UK SuDS Tool, modelling the 22 ha contributing area (11.3 ha impermeable, 10.7 ha vegetated). The SuDS Tool outputs a total required attenuation volume of around **15,129 m^3** for the 1 in 100-year event + 25% climate change. (see Parcel 1 storage est. attached).

For comparison, the table attached shows a range of quick storage estimates under various assumptions. The proposed approach falls within the expected range for a site with 5–10% of the gross area positively drained for the overall 219.7ha site.

We hope this approach for calculating positively drained areas is acceptable to the Board.

Parcels 2 and 3
Parcels 2 and 3 will be drained via swales, basins and underground attenuation. For these parcels, the discharge rate will be recalculated based on **4 l/s/ha applied to impermeable areas only**. The remainder of the parcels is covered in **granular strata**, which is expected to **slow and intercept** runoff through free voids.

Storage volumes have also been estimated using the new UK SuDS Tool:

- **Parcel 2**: 3,485 m^3 using 16.2l/s discharge rate
- **Parcel 3**: 1,956 m^3 using 9.2l/s discharge rate

The above is consistent with the volumes outlined in the previously submitted drainage strategy.

Please refer to Table 1 in the attached spreadsheet showing discharge and storage estimates.

Input Requested
We would appreciate your feedback on the following points:

1. Confirmation that the use of 10% of Parcel 1 (22 ha) as the contributing area for both discharge and storage calculations is acceptable. This value was selected following a series of runoff and storage scenarios, where more conservative assumptions produced storage volumes considered disproportionate to the proposed site use. The selected approach aligns with the understanding that most of the wider parcel drains naturally to existing ditches and field drainage systems.
2. Acceptance of the proposed discharge rate of 87.8 l/s for Parcel 1, calculated using 4 l/s/ha over the 22 ha contributing area.
3. Confirmation that the SuDS Tool output of 15,129 m^3 storage for Parcel 1 (based on 1 in 100-year + 25% climate change) is an acceptable basis for design, reflecting a mix of 11.3 ha hardstanding and 10.7 ha vegetated cover within the contributing area.
4. Agreement that, for Parcels 2 and 3, it is appropriate to calculate discharge based on impermeable areas only, as the remaining areas are underlain by granular strata which are expected to intercept and attenuate surface runoff naturally.

Please let us know a convenient time to discuss further or feel free to respond by email. We are aiming to finalise the drainage strategy within this month to support the client's submission, so your prompt response would be greatly appreciated.

Kind Regards,

[redacted]

[redacted]
Senior Flood Risk & Drainaqe Consultant
Water Risk Management & Engineering

8 First Street
Manchester
M15 4RP

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Registered office: WSP House, 70 Chancery Lane, London, WC2A 1AF.

From: [redacted]@idbs.org.uk>
Sent: 13 May 2025 11:53
To: [redacted]@wsp.com>
Cc: [redacted]@buckinghamshire.gov.uk; [redacted]@wsp.com>; [redacted]
[redacted]@wsp.com>; [redacted]@rsk.co.uk>
Subject: RE: Rosefield Solar Farm (DCO) - Drainage Strategy Enquiry

Hi [redacted],

Thanks for your time today. Please see comments below concerning answers to your Technical Note 2 questions:

1. *Is the surface water drainage approach acceptable in principle for the proposed PV solar arrays?*

Generally, yes, though Parcel 1 requires further discussion as per our meeting today.

2. *Is the surface water drainage approach, as proposed, acceptable in principle for the BESS, Main Collector Compound, and Substation?*

Yes, as per our discussion today.

3. *Are there any points the IDB would like to raise that would be strategic in agreeing the drainage proposals as part of the DCO process?*

Provided we are afforded access to the watercourses we have adopted into our maintenance programme and can on an at-need basis access any other watercourse within the district, there should be no headaches.

4. *Can you confirm the ordinary watercourses and drainage assets you manage near and within the site?*

There are no assets we manage, but certain watercourses we maintain. See here for more details, plus the map extract below (district hashed in green, watercourses we maintain in bold blue, but note all watercourses in-district are subject to our control).

5. *Are there any design preferences or requirements for new drainage infrastructure?*

We tend to follow "Sewage Sector Guidance" and national SuDS methodology when imposing requirements. For headwalls, we accept a minimum toe of 400 mm for precast, or 300 mm for bagged & staked.

6. *Can you confirm whether the IDB would consider adopting any part of the drainage infrastructure?*

This is something we can certainly discuss. We'd instigate a commuted sum charging system if mutually agreeable, which but we'd have to know more before entering into any discussion. Any agreement would be calculated on a 50-year lifetime.

7. *What maintenance obligations fall to the landowner/developer?*

The Board's powers are permissive. We undertake maintenance as directed by the voting members of the Board, on an at-need basis. Riparian responsibilities are not suspended by this and thus remain in force.

8. *Is land drainage consent required for the proposed outfalls or works within 9m of a watercourse?*

Yes. See our byelaws here for our "B&O" district for more information. Basically, any discharge to, or development within 9 m of, a watercourse is subject to our consent. "Development" includes planting, fencing and landscaping, not just hard engineering.

9. *What specific consents or permits are required for any culverting, realignment, or construction near IDB assets?*

We consent under S.23 and our byelaws made under S.66 of the Land Drainage Act. See here for our byelaws and here for guidance.

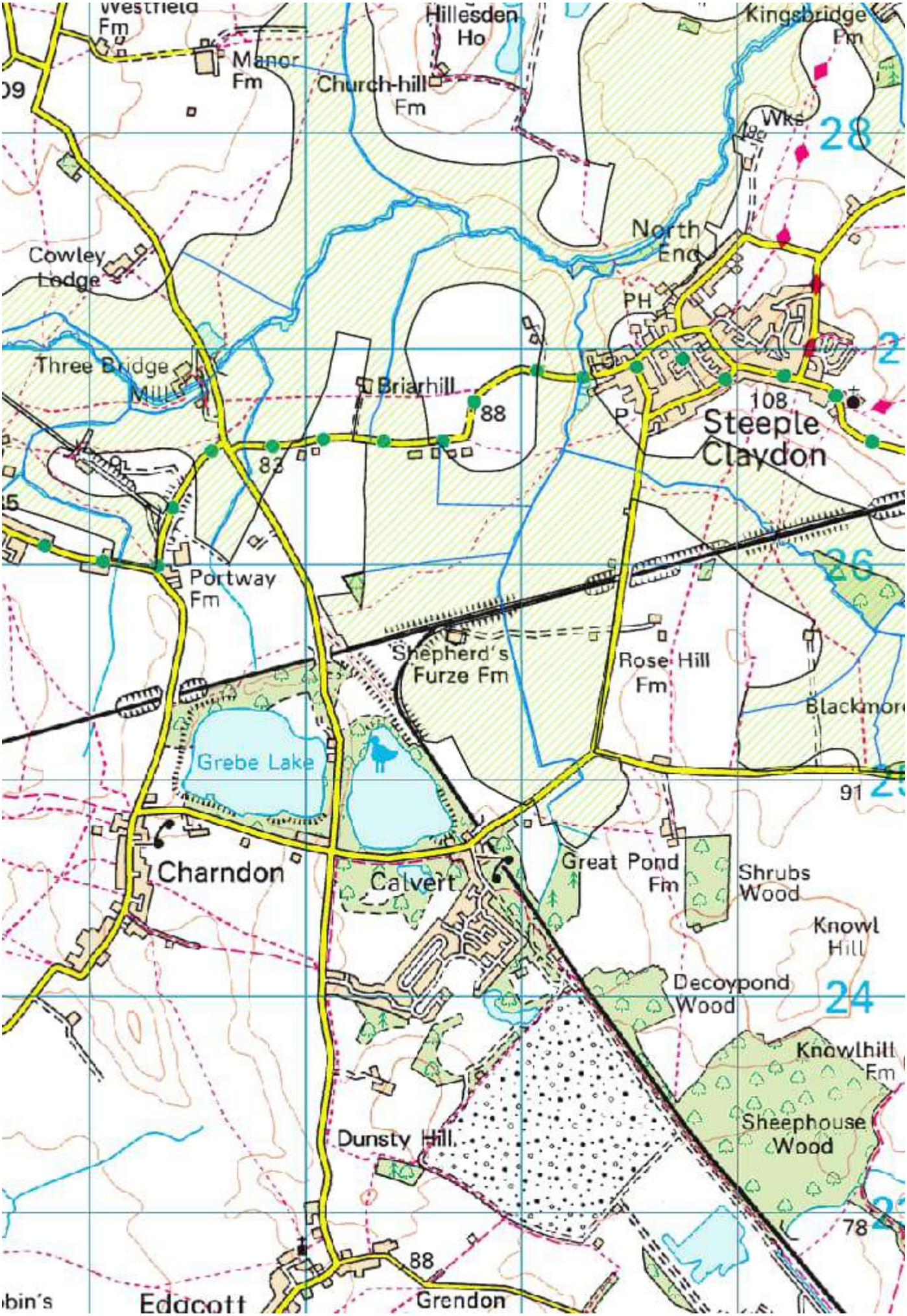
10. *What are the timeframes and fees associated with obtaining the necessary consents?*

We process consent applications usually within 6 weeks of receipt and release them once the required fees have been paid. Usually, we turn them around in less than 6 weeks, but this depends on the complexity of the application, delays to responses to any questions we have and our workload – e.g. during times of emergency, like when the A421 flooded last year, response times might be longer. Should we receive no payment, no or unsatisfactory answers to our queries, or the proposal is incompatible with our requirements, we refuse consent. Refusal does not prejudice re-application. What we tend to find holds things up is payment. We accept BACS or cheque only for consent payments (they're statutory and not VAT-deductible, plus because the charges were laid down in the Act in 1991 and have not been adjusted for inflation, we lose money on them – invoices cost internally to process and credit card companies charge us for use). For Surface Water Development Contributions (guidance here), due the amounts involved, we do issue invoices.

Regarding the section of watercourse up at Calvert we discussed, our lads think we maintain that section from the Southern (right-hand) side, which is on your boundary. I will visit the area in the next few weeks to confirm. We will thus need access for a tractor flail. We might be able to work on the other side, if the hedge was removed and re-planted on the Southern side. This may actually be beneficial as the shade would cut down weed growth in-channel and thus improve conveyance.

Let me know if you have any further questions.




Westfield Fm
Manor Fm
Hillesden Ho
Church-hill Fm
Kingsbridge Fm
Wks
28
North End
Cowley Lodge
PH
Three Bridge Mill
Briarhill
88
108
Steeple Claydon
82
Portway Fm
26
Shepherd's Furze Fm
Rose Hill Fm
Blackmore
Grebe Lake
91
Charndon
Calvert
Great Pond Fm
Shrubs Wood
Knowl Hill
Decoypond Wood
24
Knowlhill Fm
Sheephouse Wood
Dunsty Hill
78
88
Edgcott
Grendon

[redacted]
Senior Engineer

Bedford Group of Drainage Boards | Vale House | Broadmead Road | Stewartby | Bedfordshire | MK43 9ND

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From: [redacted]@wsp.com>
Sent: 06 May 2025 13:54
To: [redacted]@idbs.org.uk>; [redacted]@buckinghamshire.gov.uk
Cc: [redacted]@wsp.com>; [redacted]@wsp.com>; [redacted]@rsk.co.uk>; [redacted]@rsk.co.uk>; [redacted]@rsk.co.uk>; [redacted]@edf-re.uk>; info@rosefieldsolarfarm.co.uk; [redacted]@buckinghamshire.gov.uk; [redacted]@edf-re.uk
Subject: RE: Rosefield Solar Farm (DCO) - Drainage Strategy Enquiry

Good afternoon, [redacted]

Thanks for your email and raising your points.

Regarding your points 1, 2 and 3 below: the only solar panels near the substation area will be located across plots E10, E21 and E23. No solar panels are proposed across the SA plots.

Following a call with Jason Small at the LLFA, it was agreed that a joint call would be beneficial to discuss the drainage strategy and the ultimate discharge rates from the solar farm.

Our availability next week is as follows. I appreciate this is short notice, but I hope this can be accommodated by all parties:

- **Monday 12 May:** 1:00–4:30pm
- **Tuesday 13 May:** 10:00am–2:00pm

Any concerns regarding access to watercourses or potential obstructions would likely be best addressed by the FRA or design team.

I am reattaching our technical note for reference. Please, if you could assist with any of the queries raised in the technical note in the meantime, that would be much appreciated.

Please could you confirm your availability for either of the proposed slots by close of business tomorrow? I will then issue a meeting invite accordingly.

Kind Regards,
[redacted]

[redacted]
Senior Flood Risk & Drainaqe Consultant
Water Risk Management & Engineering

8 First Street
Manchester
M15 4RP

Annual Leave Notice:
14.05 - 21.05

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From: [redacted]@idbs.org.uk>
Sent: 29 April 2025 13:38
To: [redacted]@wsp.com>
Cc: [redacted]@wsp.com>; [redacted]@wsp.com>; Hannah [redacted]@rsk.co.uk>; [redacted]@rsk.co.uk>; [redacted]@rsk.co.uk>; [redacted]@edf-re.uk>; info@rosefieldsolarfarm.co.uk; [redacted]@buckinghamshire.gov.uk
Subject: RE: Rosefield Solar Farm (DCO) - Drainage Strategy Enquiry

Hi [redacted]

Thanks for the information. I'm a little concerned about what's presented thus far:

1. I can only see part of plots E21 and E23, on the plan. They show panels right up to the watercourse on the side we have to work on (as per the hand annotated plan I submitted).
2. There's insufficient information about SA54-56 for me to form an opinion.
3. There's insufficient information about SA46-50, likewise.

Regarding point 1, the working banks noted are dictated by access opportunities and obstructions such as trees etc.

Thanks,
[redacted]

[redacted]
Senior Engineer

Bedford Group of Drainage Boards | Vale House | Broadmead Road | Stewartby | Bedfordshire | MK43 9ND

Tel: 01234 767995 | www.idbs.org.uk

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From: [redacted]@wsp.com>
Sent: 17 April 2025 14:23

To: [redacted]@idbs.org.uk>
Cc: [redacted]@wsp.com>; [redacted]@wsp.com>; [redacted]@rsk.co.uk>; [redacted]@rsk.co.uk>; [redacted]@rsk.co.uk>; [redacted]@edf-re.uk>; info@rosefieldsolarfarm.co.uk; [redacted]@buckinghamshire.gov.uk
Subject: Rosefield Solar Farm (DCO) - Drainage Strategy Enquiry

Dear [redacted]

I am writing regarding the drainage strategy that WSP is developing for the Rosefield Solar Farm project. I understand you were previously consulted on the EIA matters (please find the annotated drawing for reference).

Also attached is a Technical Note outlining the proposed drainage scheme for the project, including drainage strategy plans for all three Parcels/Sites.

We would welcome your feedback and are happy to arrange a Teams call should you find it helpful to discuss the details further.

In the meantime, please do not hesitate to get in touch if you have any questions.

Kind Regards,

[redacted]
Senior Flood Risk & Drainaqe Consultant
Water Risk Management & Engineering

8 First Street
Manchester
M15 4RP

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18.04 – 21.04
15.05 - 21.05

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-LAEmHhHzdJzBlTWfa4Hgs7pbKl

Outlook

RE: Rosefield Solar Farm (DCO) - Drainage Strategy Enquiry

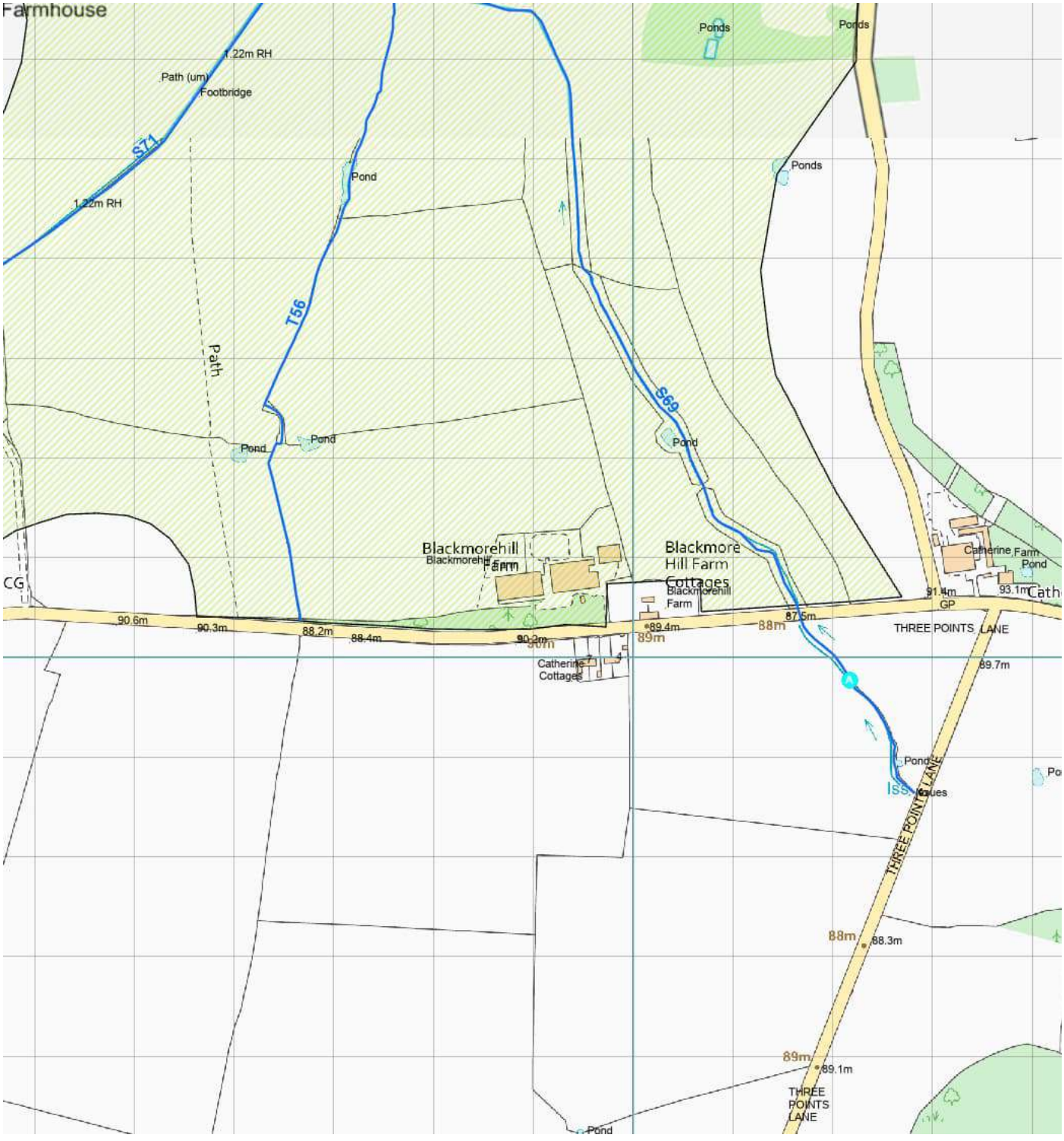
From [redacted]@idbs.org.uk>
Date Thu 6/12/2025 9:16 AM
To [redacted]@wsp.com>

Hello [redacted]

The map extract below shows our district in shaded green, and the watercourses we maintain in dark blue with a number designation. The bit you've pointed to is just outside the district. You'll have to speak to the LLFA about Land Drainage consenting. If you're planning a discharge of stormwater to that section, because the part immediately downstream is within district you'll still be liable for the Surface Water Development Contribution charge as per out policy. https://www.idbs.org.uk/wp-content/uploads/2025/04/development-control-charges-and-fees-2025-26.pdf

You can see a detailed map of our district at https://www.idbs.org.uk/about-us/boards-drainage-district/ Click on the "view larger map" for an ESRI detailed webpage which is searchable.

Regards,
[redacted]



[redacted]
Senior Engineer

Bedford Group of Drainage Boards | Vale House | Broadmead Road | Stewartby | Bedfordshire | MK43 9ND

Tel: 01234 767995 | www.idbs.org.uk

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From: [redacted]@wsp.com>
Sent: 11 June 2025 16:43
To: [redacted]@idbs.org.uk>
Subject: RE: Rosefield Solar Farm (DCO) - Drainage Strategy Enquiry

Hi [redacted]

Yes, please see details below.

Grid Reference:SP712249
X (Easting) , Y (Northing): 471217 , 224978

What3Words: lodge.panthers.array

Best regards,
[redacted]

From: [redacted]@idbs.org.uk>
Sent: 11 June 2025 16:38
To: [redacted]@wsp.com>
Subject: RE: Rosefield Solar Farm (DCO) - Drainage Strategy Enquiry

Hi [redacted]
Do you have a post code or grid ref for this?
Scott

[redacted]
Senior Engineer

Bedford Group of Drainage Boards | Vale House | Broadmead Road | Stewartby | Bedfordshire | MK43 9ND

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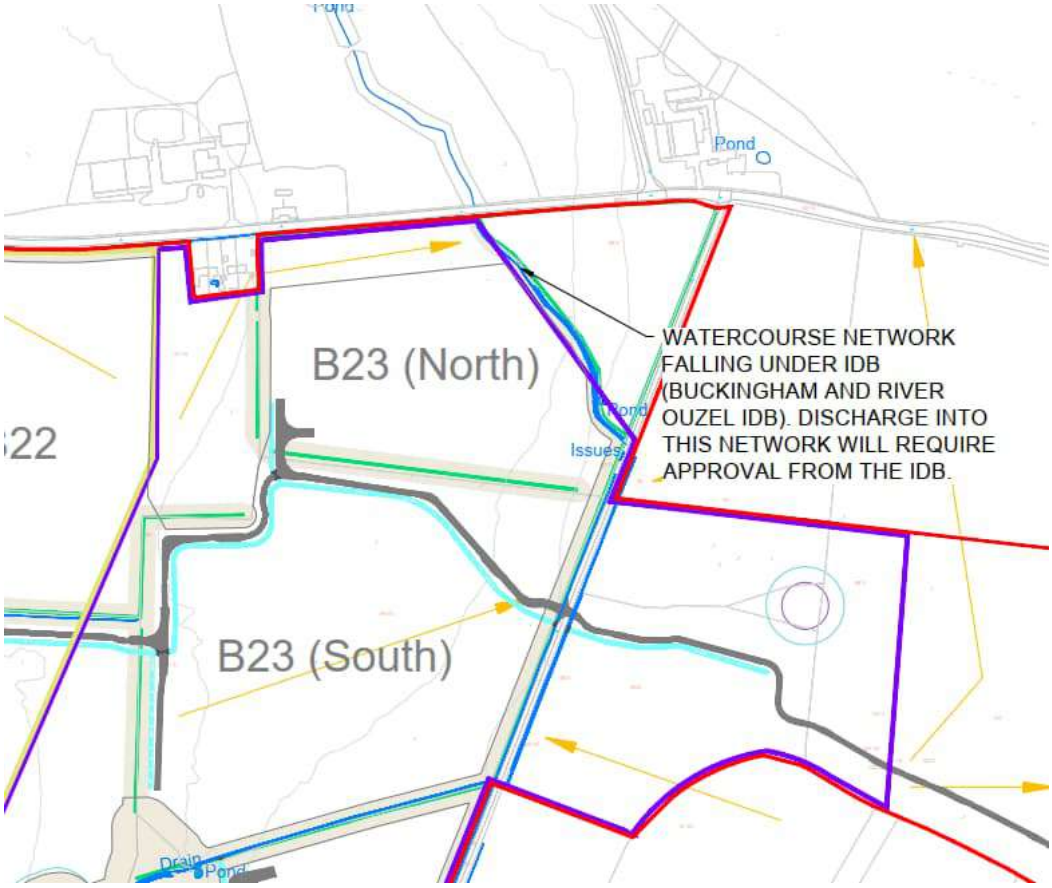
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From: [redacted]@wsp.com>
Sent: 11 June 2025 16:35
To: [redacted]@idbs.org.uk>
Subject: RE: Rosefield Solar Farm (DCO) - Drainage Strategy Enquiry

Hi [redacted]

Thank you for letting us know. I will forward that onto the wider team.

With regard to the watercourse located in the northeastern corner of Parcel 1, as shown in the excerpt below, could you please confirm whether the IDB has any maintenance responsibilities for this section of the network? Or would this fall under the ownership or maintenance remit of the LLFA?



Many thanks in advance for your clarification.

Kind Regards,

[redacted]
Senior Flood Risk & Drainage Consultant
Water Risk Management & Engineering

8 First Street
Manchester
M15 4RP

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From: [redacted]@idbs.org.uk>
Sent: 11 June 2025 15:36
To: [redacted]@wsp.com>
Subject: RE: Rosefield Solar Farm (DCO) - Drainage Strategy Enquiry

Hello [redacted]

In our Teams meeting recently we talked about a watercourse at the Northern end of your parcel, right near the village of Calvert. I have had a look at the watercourse. Due to its proximity to the EWR / HS2 works in the area we have not been there for some time and it's not been kept in good order. There is therefore no preferential bank we might work from. As such, you can approach this watercourse with fencing etc. but you will still need to leave at least 3 m from bank top to allow the passage and use of machinery. See the attached picture, where I stood in the watercourse and looked upstream,.

Meeting:	*Buckinghamshire LLFA meeting*
Date and time:	*30/04/2023*
Location:	*Teams*
Attendees:	[redacted]

Item	Actions and responsibility
Introduction The meeting was arranged between the LLFA and WSP, with representation from RSK and EDF in attendance. The main objective of the meeting was to discuss the preliminary surface water drainage strategy with the LLFA, where possible confirm their specific design requirements and **gain agreement in principle regarding the proposed drainage approach planned for a DCO submission** for Parcels 1, 2 and 3**.**	
Proposed Development An update was provided to the proposed development plan and relocation of the substation from plot E23 to E20 (EDF). A brief introduction of the proposed site uses for Parcels 1-3, with overview of the assumptions on impermeability based on the proposed design elements (WSP). The LLFA was generally happy with the assumptions.	
Discharge rates Discharge to any watercourse within the IDB catchment will likely require meeting their requirements on discharge rates. That includes the catchments across Parcel 1, which drain into the IDB network to the northeast and northwest (RSK).	

Rosefield Solar Farm
Cardinal Place
80 Victoria Street
London
SW1E 5JL

The LLFA noted that the IDB usually requires a discharge rate to 4l/s/ha from the proposed impermeable area. The LLFA's approach may vary from site to site and may be adjusted from the Qbar requirement to limit the impact on the development. It has been agreed that a joint approach should be taken on how discharge rates are calculated to ensure a consistent approach is applied across the development, regardless of the ownership as the IDB jurisdictions starts just downstream of the LLFA ordinary watercourse jurisdiction. WSP to arrange a joint meeting with the IDB and LLFA to confirm discharge rate requirements for all 3 parcels. WSP will also prepare a matrix comparing discharge rates based on gross site area versus impermeable area only (the latter being the more conservative approach) for discussion with these two bodies.	**WSP**
SuDS Design The LLFA agreed on the following: **Storage Requirements:** Each site area will need to accommodate the 1 in 100-year storm event plus climate change (25%) storage volume, including volumes within SuDS features and surface storage. As a result, the design storage volume for SuDS ponds may be limited to catering for the 1 in 100-year plus climate change event only, as long as the difference in flows is contained on site. **Climate Change Allowance:** The 25% allowance used is appropriate for the site location and the anticipated development lifespan. **Pumping:** The use of pumping for the surface water drainage network, if required, is acceptable to the LLFA. The final requirement for pumping—particularly within Parcel 2—will depend on the detailed platform design, cut and fill strategy, and available space for SuDS. A pragmatic approach was requested by the LLFA in decision making to avoid significant earthworks if gravity drainage scope is limited. **SuDS Selection:** The proposed SuDS strategy across Parcels 1 to 3 is considered reasonable and appropriate given the site constraints and proposed land uses. **Drainage Strategy:** The current drainage strategy for the proposed layout is deemed sufficient to provide the required on-site storage, noting that a conservative approach has been used in estimating storage volumes (based on proposed impermeable areas for calculating allowable discharge rates), which may be readjusted following further consultations with the IDB.	**WSP**
Unresolved Queries	**LLFA**

Rosefield Solar Farm
Cardinal Place
80 Victoria Street
London
SW1E 5JL

The queries outlined in the **WSP Technical Note ref 1.0, dated 17 April 2025** (appended to this document) will be responded to by the LLFA following the meeting.

Further Meetings

WSP will arrange a joint meeting with the IDB and LLFA officers to discuss the scheme and agree a coordinated approach on allowable discharge rates.

General Notes

1. All parties will review and confirm the accuracy of the meeting outcomes and action points.
2. Any additional information or clarification required by any parties should be requested at the earliest opportunity.
3. Design development will continue in parallel with ongoing liaison with relevant authorities to ensure alignment with technical and regulatory requirements.
4. The drainage strategy and associated calculations will be refined as the design progresses and more site-specific information becomes available.
5. Minutes and follow-up actions will be circulated to attendees for record and comment.

TECHNICAL NOTE 1.0

DATE:	17 April 2025	**CONFIDENTIALITY:**	Public
SUBJECT:	DS Enquiries to LLFA		
PROJECT:	Rosefield Solar Farm	**AUTHOR:**	[redacted]
CHECKED:	[redacted]	**APPROVED:**	[redacted]

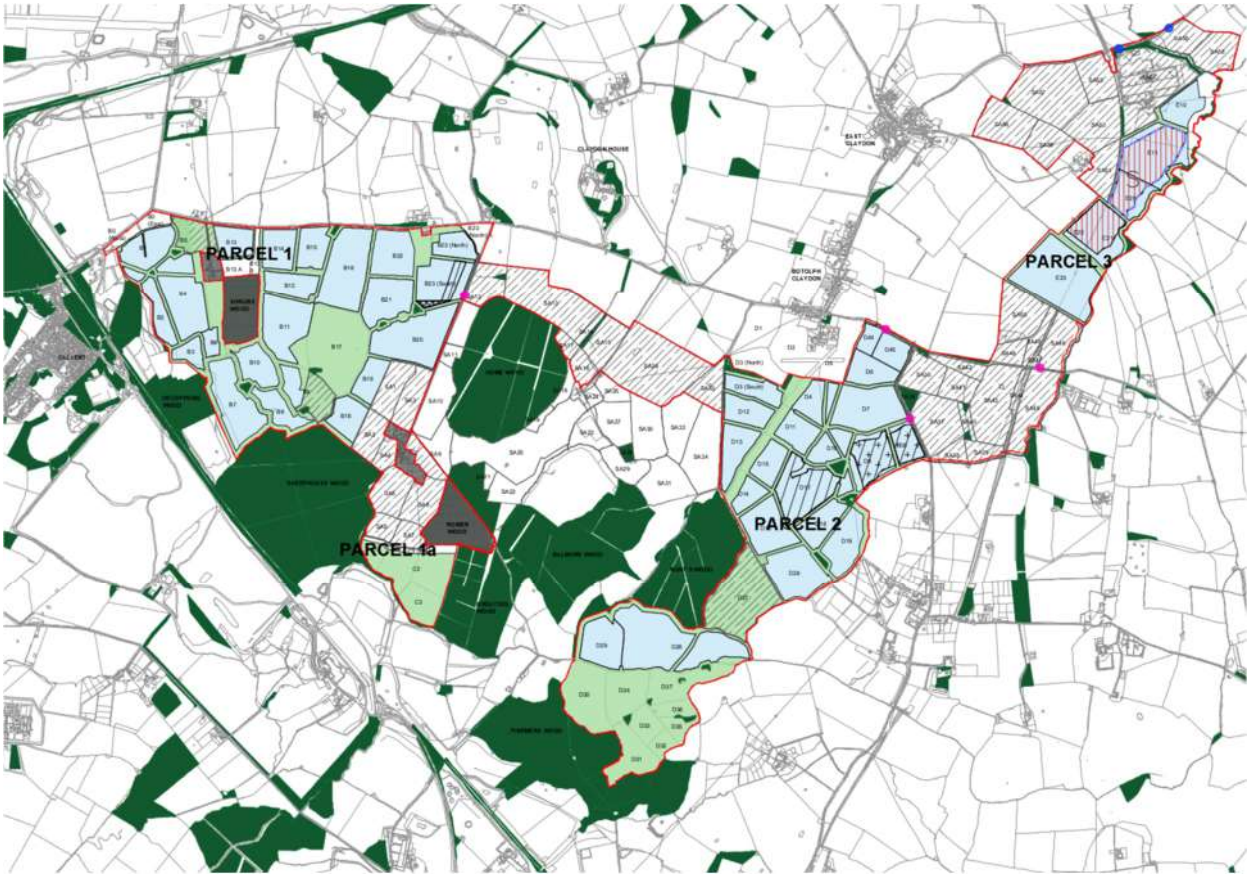
1. INTRODUCTION

1.1.1. WSP has been commissioned by EDF to prepare a surface water Drainage Strategy (DS) to inform the preparation of a DCO submission for the Rosefield solar farm project in Buckinghamshire. The proposed development will span over three nearby Parcels and will consist of solar arrays, Battery Energy Storage System (BESS) and an associated substation and collector compound.

1.1.2. The proposed development lies near the settlements of Calvert, Middle Claydon, Botolph Claydon, East Claydon and Hogshaw. Steeple Claydon, Edgcott, Shipton Lee, Quainton, Granbrough and Winslow.

1.1.3. The National Grid References provided below are for the approximate centre of each site. A site location plan is indicated below.

- Parcel 1: SP 702 244
- Parcel 2: SP 730 231
- Parcel 3: SP 753 255



TECHNICAL NOTE 1.0

DATE:	17 April 2025	**CONFIDENTIALITY:**	Public
SUBJECT:	DS Enquiries to LLFA		
PROJECT:	Rosefield Solar Farm	**AUTHOR:**	[redacted]
CHECKED:	[redacted]	**APPROVED:**	[redacted]

1.1.4. The proposed development has previously been discussed with the LLFA officers during preparation of the Flood Risk Assessment. For reference, the latest meeting's notes are attached to this Technical Note. Approach on the surface water management has also been commented by the LLFA's officers and generally no objection was raised.

1.1.5. Since then, the concept design has been developed along with a drainage strategy layout, which is subject to this Technical Note.

1.1.6. The Technical Note has been prepared to provide an overview of the approach to the drainage strategy for the proposed development. We seek to confirm that the drainage scheme is acceptable in principle to the LLFA and to identify any further requirements.

2. DRAINAGE STRATEGY APPROACH

2.1.1. The following section includes the summary of general approach embedded in the proposed drainage scheme.

2.1. PROPOSED SURFACE WATER STRATEGY- SOLAR ARRAYS (PARCEL 1)

PANEL DESIGN

2.1.2. PV solar panels are predominantly proposed on the land referenced as Parcel 1. They are also partially included as part of the Site 2 and Site 3 layout.

2.1.3. It is anticipated that any precipitation falling on each solar panel will runoff the panels and flow towards rain shadow of the down-slope modules. Due to the existing geology on site, it is considered that there is a limited potential for water to infiltrate into the ground.

2.1.4. The solar arrays are designed to be placed in rows with spaces of several metres in between the leading edge of one row and the trailing edge of the row behind.

2.1.5. Where feasible, panels mounted in multiple horizontal rows should be separated by a horizontal 'rainwater' gap. This gap will facilitate rainwater interception by vegetation and allow it to flow overland across the ground between the panels, thereby replicating Greenfield runoff conditions.

2.1.6. Currently, there are three different types of foundations considered for the PV panel structures (ballasted foundation, helical piled foundation and driven pier foundation). Subject to detailed design, the type of foundation will need to be considered in the drainage design. The design of the foundations should take into account local soil conditions and drainage patterns to ensure proper support and stability for the solar panels. Inadequate drainage around the foundations could lead to soil erosion or instability over time. If the foundation structures were of significant area in total, they would have to be considered into the overall impermeability factor across that catchment.

2.1.7. Since the proportion of the total area using concrete ballasts (or other) has been assumed to be 1%, the impacts to the drainage strategy from these impermeable structures have not been considered at this stage.

2.1.8. Outline Drainage Strategy plans for Site 1, 2 and 3 (**Drawing Ref. RSFD-05-DR-000100, RSFD-05-DR-000101, RSFD-05-DR-000102**) attached to this Technical Note show the type of surface water features used to manage the overland flow across this sloping land and the runoff from the

proposed access tracks. The drawings also show the indicative locations of the swales and cut-off ditches and their connectivity to the wider watercourse network within the site. Both features will provide some volume retention and water quality treatment, subject to final design and the confirmation of final areas and finish material. **Drawing Ref: RSFD-05-DR-000099** shows a standard cross-section through a cut-off ditch and swale.

2.2. PROPOSED SURFACE WATER STRATEGY- OTHER AREAS

BESS (PARCEL 2), MAIN COLLECTOR COMPOUND, SUBSTATION (PARCEL 3)

2.3.1. These areas are proposed to be drained via SuDS features including ponds, swales, filter drains and underground geo-cellular storage.

2.3.2. All impermeable surfaces will be positively drained with runoff limited to Greenfield QBAR rate into the adjacent watercourse / ditch network. Provision of storage volume for up to 1 in 100 year plus 25% is proposed within the SuDS features.

2.3.3. Pollution control measures are proposed as part of drainage works for the proposed Substation, given the likelihood of hydrocarbons contamination from proposed transformers. As part of prevention, the transformers will be enclosed by bunded structures and runoff will be directed through an oily water network and an oil separator before discharging into the surface water drainage system. It is deemed that adequate measures will be provided prior to discharge into the local watercourse network.

2.3.4. In addition, the proposed attenuation systems are expected to provide sufficient capacity for fire water management within the BESS area, helping to prevent contaminated water from entering the wider watercourse network.

2.3.5. Consultation with Buckingham and Rover Ouzel Internal Drainage Board (IDB) is being undertaken to agree the drainage scheme is acceptable in principle, where the site runoff is directed into the IDB network.

2.3.6. Outline Drainage Strategy plans (Drawing Ref: RSFD-05-DR-000101, RSFD-05-DR-000102) show the indicative drainage layout proposed for the BESS, Main Collector Compound and Substation. These also outline the types of SuDS used, proposed discharge rates and resulting storage volume requirements.

3. CONSULTATIONS ENQUIRIES

1. Is the surface water drainage approach acceptable in principle to the LLFA for the proposed PV solar arrays?

2. Is the surface water drainage approach, as proposed, acceptable in principle to the LLFA for the BESS, Main Collector Compound and Substation?

3. Are there any points the LLFA would like to raise, that would be strategic in agreeing the drainage proposals as part of the DCO process?

TECHNICAL NOTE 1.0

DATE:	17 April 2025	**CONFIDENTIALITY:**	Public
SUBJECT:	DS Enquiries to LLFA		
PROJECT:	Rosefield Solar Farm	**AUTHOR:**	[redacted]
CHECKED:	[redacted]	**APPROVED:**	[redacted]

To inform our assessment, we would be grateful if the LLFA could provide as much of the following information as possible in relation to the site. We appreciate that some of this may have already been submitted as part of previous ES/FRA consultations, but we would be grateful if it could be shared to support our review.

4. Any known historic flooding issues from the local watercourses,

5. Any known surface water flooding issues in this area,

6. Any known highway flooding issues,

7. Any groundwater flooding or emergence issues,

8. Any records of culverted watercourses,

9. Information whether the site is within a critical drainage area,

10. Confirmation of the ownership of the onsite local watercourses/ditches,

11. Any policies or guidance produced specifically by the LLFA in relation to drainage works in this area.

If possible, and a Teams meeting with the LLFA officers could be arranged to discuss the above drainage proposal, that would be very beneficial to the progression of the Scheme. Please also inform of any cost associated with the meeting.

Annex:

- Drawing Ref. RSFD-05-DR-000100, dated 28.03.2025
- Drawing Ref. RSFD-05-DR-000101, dated 27.01.2025
- Drawing Ref. RSFD-05-DR-000102, dated 28.03.2025

STRATEGY ONLY
NOT FOR CONSTRUCTION

SITE 1

TOTAL CATCHMENT AREA 1A: 36.5 HA
IMPERMEABLE AREA: 0.91HA
SEE RSFD-05-DR-00100a FOR DETAILS

TOTAL CATCHMENT AREA 1B: 87.9 HA
IMPERMEABLE AREA1.48
SEE RSFD-05-DR-00100b FOR DETAILS

WATERCOURSE NETWORK FALLING UNDER IDB (BUCKINGHAM AND RIVER OUZEL IDB). DISCHARGE INTO THIS NETWORK WILL REQUIRE APPROVAL FROM THE IDB.

WATERCOURSE NETWORK FALLING UNDER IDB (BUCKINGHAM AND RIVER OUZEL IDB). DISCHARGE INTO THIS NETWORK WILL REQUIRE APPROVAL FROM THE IDB.

TOTAL CATCHMENT AREA 1C: 56.3 HA
IMPERMEABLE AREA 1.07
SEE RSFD-05-DR-00100c FOR DETAILS

TOTAL CATCHMENT AREA 1D: 22.2 HA
IMPERMEABLE AREA:0.4HA
SEE RSFD-05-DR-00100d FOR DETAILS

TOTAL CATCHMENT AREA 1E: 16.8 HA
IMPERMEABLE AREA 0.71HA
SEE RSFD-05-DR-00100d FOR DETAILS

B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13 B14 B15 B16 B17 B18 B19 B20 B21 B22 B23 (North) B23 (South)

Pond Ponds Drain Ditch Balancing Pond Water Wells Issues

LEGEND:

- EXISTING WATERBODY
- DIRECTION LAND SLOPES
- CATCHMENT 1A
- CATCHMENT 1B
- CATCHMENT 1C
- CATCHMENT 1D
- CATCHMENT 1E
- RED LINE BOUNDARY
- 89.50 EXISTING GROUND LEVELS
- PROPOSED SWALE
- PROPOSED TRACK
- BADGER 30m/50m BUFFER
- PROPOSED CULVERT
- PROPOSED OUTFALL
- HEDGEROW
- HEDGEROW MITIGATION BUFFER

Notes:

1. ALL DIMENSIONS ARE IN MILIMETERES (mm) AND ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM (MAOD) UNLESS STATED OTHERWISE
2. THIS DRAWING SHOULD BE READ IN CONJUCTION WITH ALL RELEVANT DOCUMENTS, AND STANDARD DETAILS, ASWELL AS WITH THE FOLLOWING DRAWINGS:
   - RSFD-05-DR-00099 – TYPICAL CROSS SECTIONS THROUGH A CUT-OFF DITCH AND A SWALE
   - RSFD-05-DR-000101– PRELIMINARY DRAINAGE LAYOUT (SITE 2)
   - RSFD-05-DR-000102 – PRELIMINARY DRAINAGE LAYOUT (SITE 3)
   - RSFD-05-DR-00055 – SOLAR PV ARRAY LAYOUT
   - RSFD-01-DR-00097 INDICATIVE LANDSCAPE AND ECOLOGICAL MITIGATION AND ENHANCEMENTS – PARCEL 1, REV. P01.1
   - RSFD-05-DR-00100 (A/B/C/D) –DETAILED ARRANGEMENTS FOR THE INDIVIDUAL CATCHMENTS
3. TYPICAL DETAILS ARE SUBJECT TO DETAIL DESIGN AND CONSIDERATION OF VARIOUS FACTORS E.G SITE USAGE, SLOPE, CATCHMENT SIZE ETC.
4. SURFACE WATER DRAINAGE CAN BE DELIVERED ACROSS THE DEVELOPMENT PARCELS WITH EMPHASIS ON DELIVERING DRAINAGE BY GRAVITY. THIS INDICATIVE DRAINAGE LAYOUT MAY CHANGE AND IS ALSO SUBJECT TO FURTHER SURVEYS AND DETAILED DESIGN, AS WELL AS ANY CONSTRAINTS PRESENT ON SITE.
5. THE LEVELS AT THE RECEIVING WATERCOURSES AND DITCHES ARE UNKNOWN AND WILL NEED TO BE CONFIRMED AT THE DETAILED STAGE BY MEANS OF UNDERTAKING TOPOGRAPHICAL, RIVER CROSS SECTION AND DRAINAGE CONNECTIVITY SURVEYS TO CONFIRM FEASIBILITY OF CONNECTION AND ANY POTENTIAL CONSTRAINTS, BY GRAVITY, OR OTHERWISE.
6. THE PRINCIPLES FOR MANAGING OVERLAND SURFACE WATER RUNOFF FROM THE VARIOUS SUBCATCHMENTS WITHIN SITE 1 WILL FOLLOW THE EXISTING WATERSHED WITHIN THE SITE TO OUTFALL INTO THE NEARBY NETWORK OF WATERCOURSES AS EXISTING.
7. SURFACE WATER MANAGEMENT ACROSS THE CATCHMENTS WILL INCLUDE THE FOLLOWING:
   - WHERE NECESSARY NEW CUT-OFF DITCHES WILL BE INTRODUCED TO PROVIDE CONTINUITY OF FLOW WITHIN THE SITE. THIS WILL ALSO MANAGE OVERLAND FLOW UPSTREAM OF ACCESS TRACKS. THE NETWORK OF CUT-OFF DITCHES WILL BE INSTALLED UPSTREAM TO THE ACCESS TRACKS TO MANAGE RUNOFF TOWARDS THE TRACKS
   - WHERE ACCESS TRACKS ARE PROPOSED, THEY WILL BE DRAINED DIRECTLY INTO SWALES WHICH PROVIDE BOTH ATTENUATION AND TREATMENT OF THE FLOWS.
   - AN ALLOWANCE OF SPACE WILL BE REQUIRED ON SIDES OF ACCESS TRACKS TO MAKE SPACE FOR THESE WHERE INDICATED
   - POINTS OF CONNECTION FROM THE CUT-OFF DITCH NETWORK AND SWALE NETWORK WILL BE CONFIRMED AT FURTHER STAGE AND, WHERE FEASIBLE, WILL ALIGN WITH THE OVERALL ECOLOGICAL MITIGATION OBJECTIVES FOR THE PROJECT (RSK)
8. STORAGE REQUIRED FOR A 1 IN 100YEAR + 25% CLIMATE CHANGE FROM THE ACCESS TRACKS WILL BE ACCOMMODATED CLOSE TO SOURCE PARTIALLY WITHIN THE SUITABLY DESIGNED SWALES WITH CHECK DAMS, AS WELL AS WITHIN THE WIDER ECOLOGICAL MITIGATION AREAS WHERE SUITABLE (EXISTING PONDS AND DRAINS)
9. SHORT SECTIONS OF CULVERTS MAY BE REQUIRED TO INTERCONNECT THE SWALES FROM THE VARIOUS PLOTS WITHIN THE SUBCATCHMENTS 1A–1E.
10. THE FIELD MAY ALSO BE SERVED BY A NETWORK OF LAND DRAINS WHICH WILL REQUIRE REALIGNMENT TO ENSURE CONTINUITY OF DRAINAGE OF THE SITE AND PREVENT INCREASE IN FLOOD RISK.

REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
P03	28/03/2025	FOR COMMENTS	CT	AM	VM
P02	28/02/2025	DRAFT FOR DISCUSSION ONLY	RP	AM	VM
P01	24/01/2025	FOR REVIEW	ASM	AM	VM

Rosefield Solar Farm

Rosefield Solar Farm

DOCUMENT:
ROSEFIELD SOLAR FARM

DRAWING TITLE:
SITE 1 - OUTLINE DRAINAGE STRATEGY - FULL SITE LAYOUT (PAGE 1/5)

DRAWING NO:	REVISION:
RSFD-05-DR-00100	P03

DATE:	DRAWN:	SCALE:
28/03/2025	CT	1:4000

SCALE BAR: 0 200m

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D4

D7

SITE 2

D8

D9

D10

17

INDICATIVE SWALE TO INTERCEPT OVERLAND FLOW FROM THE PV ARRAYS

EXISTING BOUNDARY DITCH, DEPTH UNKNOWN

OVERSIZED PIPE OR AN UNDERGROUND TANK WHERE FEASIBLE TO PROVIDE ADEQUATE STORAGE FOR THIS SECTION

FLOW CONTROL DEVICE AND DOWNSTREAM DEFENDER

FLOW CONTROL DEVICE AND DOWNSTREAM DEFENDER

FLOW CONTROL DEVICE AND DOWNSTREAM DEFENDER

IL: 99.38
ASSUMING 250MM DIA @ 1 IN 182
PLATFORM LEVEL TO BE SET AT MIN. 100.23 TO ALLOW FOR ADEQUATE PIPE COVER.
PIPE ASSUMED TO BE LAID WITHIN SUB-BASE GRAVEL SURFACE.
PIPE MAY REQUIRE CONCRETE REINFORCEMENT WHEN PASSING UNDER ROADS.

INLET
IL:
96.43

OUTLET
IL:
95.43

OUTFALL
IL: 95.2

BOTTOM OF CHANNEL APPROX. 94.9 BASED ON LIDAR DATA

ATTENUATION POND:
VOLUME PROVIDED: 1,204 M3
WATER DEPTH: 1.0 M
FREEBOARD: 0.3 M
SIDE SLOPES: 1 IN 5
LAND TAKE: 2,068 M2 + ALLOWANCE FOR 3M WIDE ACCESS

AT THIS STAGE UNIFORMED POND 94 LONG AND 22 WIDE HAS BEEN ASSUMED. THIS IS SUBJECT TO DETAILED DESIGN AND CUT AND FILL CALCULATIONS TO CONFIRM THE TOTAL VOLUME AVAILABLE.

FLOW CONTROL DEVICE

INDICATIVE OUTFALL INTO WATERCOURSE VIA A NEW HEADWALL

INLET
IL:
98.67

OUTLET
IL:
97.67

OUTFALL
97.30

BOTTOM OF CHANNEL APPROX. 97.0 BASED ON LIDAR DATA

IL: 97.14
ASSUMING 250MM DIA @ 1 IN 182
PLATFORM LEVEL TO BE SET AT MIN. 98.0 TO ALLOW FOR ADEQUATE PIPE COVER.
PIPE ASSUMED TO BE LAID WITHIN SUB-BASE GRAVEL SURFACE.
PIPE MAY REQUIRE CONCRETE REINFORCEMENT WHEN PASSING UNDER ROADS.

ATTENUATION POND:
VOLUME PROVIDED: 1,804 M3
WATER DEPTH: 1.0 M
FREEBOARD: 0.3 M
SIDE SLOPES: 1 IN 5
LAND TAKE: 2700 M2 + ALLOWANCE FOR 3M WIDE ACCESS

AT THIS STAGE UNIFORMED POND 90 LONG AND 30 WIDE HAS BEEN ASSUMED. THIS IS SUBJECT TO DETAILED DESIGN AND CUT AND FILL CALCULATIONS TO CONFIRM THE TOTAL VOLUME AVAILABLE.

FLOW CONTROL DEVICE

INDICATIVE OUTFALL INTO WATERCOURSE VIA A NEW HEADWALL

INDICATIVE OUTFALL INTO WATERCOURSE VIA A NEW HEADWALL

EXISTING HV ELECTRIC CABLE

STRATEGY ONLY
NOT FOR CONSTRUCTION

LEGEND:

- RED LINE BOUNDARY
- WATERCOURSE
- DITCH
- DIRECTION OF WATERCOURSE
- DIRECTION LAND SLOPES
- SURFACE WATER DRAINAGE
- 89.50 EXISTING GROUND LEVELS
- FLOW CONTROL
- DOWNSTREAM DEFENDER
- SUDS POND
- SWALE
- ATTENUATION TANK
- FLUVIAL FLOOD ZONE 3
- FLUVIAL FLOOD ZONE 2
- PLUVIAL FLOOD OUTLINES 3.33%/1%/ 0.1% AEP

DO NOT SCALE

NOTES:

1. ALL DIMENSIONS ARE IN MILIMETERES (mm) AND ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM (MAOD) UNLESS STATED OTHERWISE
2. THIS DRAWING SHOULD BE READ IN CONJUCTION WITH ALL RELEVANT DOCUMENTS, DRAWINGS AND STANDARD DETAILS, WHERE PROVIDED.
3. TYPICAL CROSS SECTIONS THROUGH A CUT–OFF DITCH AND A SWALE ARE INCLUDED IN DRAWING REF. RSFD–05–DR–00099. THESE TYPICAL DETAILS ARE SUBJECT TO DETAIL DESIGN AND CONSIDERATION OF VARIOUS FACTORS E.G SITE USAGE, SLOPE, CATCHMENT SIZE ETC.
4. DRAWINGS REF. RSFD–05–DR–000101 AND RSFD–05–DR–000102 PROVIDE A PRELIMINARY DRAINAGE LAYOUT PRESENTING ONE WAY OF HOW THE SURFACE WATER DRAINAGE CAN BE DELIVERED ACROSS THE DEVELOPMENT PARCELS WITH EMPHASIS ON DELIVERING DRAINAGE BY GRAVITY. THIS INDICATIVE DRAINAGE LAYOUT MAY CHANGE AND IS ALSO SUBJECT TO FURTHER SURVEYS AND DETAILED DESIGN, AS WELL AS ANY CONSTRAINTS PRESENT ON SITE.
5. THE LEVELS AT THE RECEIVING WATERCOURSES AND DITCHES ARE UNKNOWN AND HAVE BEEN ASSUMED BASED ON AVAILABLE LIDAR DATA. THESE WILL NEED TO BE CONFIRMED AT THE DETAILED STAGE BY MEANS OF UNDERTAKING TOPOGRAPHICAL, RIVER CROSS SECTION AND DRAINAGE CONNECTIVITY SURVEYS TO CONFIRM FEASIBILITY OF CONNECTION AND ANY POTENTIAL CONSTRAINTS, BY GRAVITY, OR OTHERWISE.
6. FOR THIS DRAINAGE STRATEGY UNIFORMLY SIZED PONDS HAVE BEEN ASSUMED. THIS IS SUBJECT TO DETAILED DESIGN AND CUT AN FILL CALCULATIONS TO CONFIRM THE TOTAL VOLUME AVAILABLE.
7. FOR THIS DRAINAGE STRATEGY A MINIMUM GROUND LEVEL HAS BEEN ASSUMED. FINISHED FLOOR LEVELS ARE UNKNOWN AT THAT STAGE AND WILL NEED TO BE IN COMPLIANCE WITH ANY MITIGATION MEASURES RECOMMENDED BY RSK AS PART OF THE FLOOD RISK ASSESSMENT UNDERTAKEN FOR THE SCHEME.
8. THIS FIGURE FOCUSES ON SECTIONS D8 AND D9 RATHER THAN THE ENTIRE SITE 2 AREA

REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
P01	27/01/2025	FOR REVIEW	ASM	AM	VM

Rosefield Solar Farm

Rosefield Solar Farm

DOCUMENT:
ROSEFIELD SOLAR FARM

DRAWING TITLE:
OUTLINE DRAINAGE STRATEGY - SITE 2

DRAWING NO:	REVISION:
RSFD-05-DR-00102	P01

DATE:	DRAWN:	SCALE:
27/01/2025	AM	1:1250

SCALE BAR:
0 200m

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Name	Fields	Approx Area per compound (m2)	% Impermeable	Total Impermeable Area (m2)	Qbar (l/s)	Vol. 1 in 100yr + 25% Causeway Flow	Provided within piped network (10%)	Provided on plot (5%)	Provided in SuDS Basins	Provided in Attenuation Tank
Main Collector Compound	E22, Site 3	16987	50	8493	3.6	789	78.9	39.45	**714**	
Project Substation	E11, Site 3	42035	35	14712	6.3	1362	136.2	68.1		**1160**
BESS	D8, D9, Site 2	47874	85	40693	17.3	3806	380.6	190.3	**3008**	**650**

SITE 3

E11 E10 E20 E21 E22 E23

Well

Drain

Pond

TRANSFORMERS TO BE SURROUNDED BY AN IMPERMEABLE BUND. OILY WATER DRAINAGE TO BE INSTALLED WITH A SUITABLE OIL SEPARATOR WITH TELEMETRY MONITORING AND EMERGENCY SHUT DOWN IN PLACE. OILY WATER DRAINAGE TO BE DESIGNED FOLLOWING THE BEST PRACTICE GUIDANCE AS WELL AS ANY SPECIFIC DESIGN MANUAL/TECHNICAL SPECIFICATIONS FROM THE OPERATOR.

IL: 88.5 ASSUMING A 150MM DIA PIPE @ 1 IN 100

FLOW CONTROL DEVICE AND DOWNSTREAM DEFENDER

EXISTING POND POTENTIALLY TO BE RESTORED IF FEASIBLE; SUBJECT TO FURTHER INVESTIGATION AND DETAILED DESIGN. THE LINK BETWEEN THE ONSITE DRAINAGE NETWORK AND WATERCOURSE TO BE VIA THIS POND

INDICATIVE LOCATION OF GEO-CELLULAR ATTENUATION TANKS

TOTAL VOLUME PROVIDED: 1,160 M3
TOTAL IMP: 1.47 HA
TOTAL DISCHARGE RATE: 6.3 L/S (QBAR)
TANK DEPTH: 1.0 M

OUTLET IL: 89.9

BOTTOM OF CHANNEL APPROX. 86.6 BASED ON LIDAR DATA

INDICATIVE OUTFALL INTO WATERCOURSE VIA A NEW HEADWALL

IL: 89.23 ASSUMING A 150MM DIA PIPE @ 1 IN 150

IL: 88.73 ASSUMING A 150MM DIA PIPE @ 1 IN 150

FLOW CONTROL DEVICE AND DOWNSTREAM DEFENDER

OUTLET IL: 87.8

BOTTOM OF CHANNEL APPROX. 87.5 BASED ON LIDAR DATA

INDICATIVE OUTFALL INTO WATERCOURSE VIA A NEW HEADWALL

OUTLET IL: 87.6

BOTTOM OF CHANNEL APPROX. 87.3 BASED ON LIDAR DATA

IL: 91.1 ASSUMING A 150MM DIA PIPE @ 1 IN 150

INLET IL: 89.6

OUTLET IL: 88.5

OUTFALL IL: 87.9

BOTTOM OF CHANNEL APPROX. 87.6 BASED ON LIDAR DATA

INDICATIVE OUTFALL INTO WATERCOURSE VIA A NEW HEADWALL

FLOW CONTROL DEVICE TO 3.6 L/S

ATTENUATION POND
VOLUME PROVIDED: 714M3
TOTAL IMP: 0.65HA
DISCHARGE RATE: 3.6 L/S (QBAR)
WATER DEPTH: 1.0 M
FREEBOARD: 0.3 M
SIDE SLOPES: 1 IN 5
LAND TAKE: 1250 M2 + ALLOWANCE FOR 3M WIDE ACCESS
DETAILS SUBJECT TO DETAILED DESIGN AND CUT AND FILL REQUIREMENTS

STRATEGY ONLY
NOT FOR CONSTRUCTION

LEGEND:

- RED LINE BOUNDARY
- EXISTING WATERCOURSE
- DIRECTION OF WATERCOURSE
- DIRECTION LAND SLOPES
- SURFACE WATER DRAINAGE
- 89.50 EXISTING GROUND LEVELS
- FLOW CONTROL
- DOWNSTREAM DEFENDER
- SUDS POND
- SWALE
- ATTENUATION TANK
- OILY WATER DRAINAGE
- OILY WATER BUNDED AREA
- OIL INTERCEPTOR
- BADGER 30m/50m BUFFER

NOTES

DO NOT SCALE

1. ALL DIMENSIONS ARE IN MILIMETERES (mm) AND ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM (MAOD) UNLESS STATED OTHERWISE
2. THIS DRAWING SHOULD BE READ IN CONJUCTION WITH ALL RELEVANT DOCUMENTS, DRAWINGS AND STANDARD DETAILS, WHERE PROVIDED.
3. TYPICAL CROSS SECTIONS THROUGH A CUT-OFF DITCH AND A SWALE ARE INCLUDED IN DRAWING REF. RSFD-05-DR-00099. THESE TYPICAL DETAILS ARE SUBJECT TO DETAIL DESIGN AND CONSIDERATION OF VARIOUS FACTORS E.G SITE USAGE, SLOPE, CATCHMENT SIZE ETC.
4. DRAWINGS REF. RSFD-05-DR-000101 AND RSFD-05-DR-000102 PROVIDE A PRELIMINARY DRAINAGE LAYOUT PRESENTING ONE WAY OF HOW THE SURFACE WATER DRAINAGE CAN BE DELIVERED ACROSS THE DEVELOPMENT PARCELS WITH EMPHASIS ON DELIVERING DRAINAGE BY GRAVITY. THIS INDICATIVE DRAINAGE LAYOUT MAY CHANGE AND IS ALSO SUBJECT TO FURTHER SURVEYS AND DETAILED DESIGN, AS WELL AS ANY CONSTRAINTS PRESENT ON SITE.
5. THE LEVELS AT THE RECEIVING WATERCOURSES AND DITCHES ARE UNKNOWN AND HAVE BEEN ASSUMED BASED ON AVAILABLE LIDAR DATA. THESE WILL NEED TO BE CONFIRMED AT THE DETAILED STAGE BY MEANS OF UNDERTAKING TOPOGRAPHICAL, RIVER CROSS SECTION AND DRAINAGE CONNECTIVITY SURVEYS TO CONFIRM FEASIBILITY OF CONNECTION AND ANY POTENTIAL CONSTRAINTS, BY GRAVITY, OR OTHERWISE.
6. FOR THIS DRAINAGE STRATEGY UNIFORMLY SIZED PONDS HAVE BEEN ASSUMED. THIS IS SUBJECT TO DETAILED DESIGN AND CUT AN FILL CALCULATIONS TO CONFIRM THE TOTAL VOLUME AVAILABLE.
7. FOR THIS DRAINAGE STRATEGY A MINIMUM GROUND LEVEL HAS BEEN ASSUMED. FINISHED FLOOR LEVELS ARE UNKNOWN AT THAT STAGE AND WILL NEED TO BE IN COMPLIANCE WITH ANY MITIGATION MEASURES RECOMMENDED BY RSK AS PART OF THE FLOOD RISK ASSESSMENT UNDERTAKEN FOR THE SCHEME.

REVISION	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
P02	28/03/2025	FOR COMMENTS	CT	AM	VM
P01	27/01/2025	FOR REVIEW	ASM	AM	VM

Rosefield Solar Farm

DOCUMENT:
ROSEFIELD SOLAR FARM

DRAWING TITLE:
OUTLINE DRAINAGE STRATEGY - SITE 3

DRAWING NO: RSFD-05-DR-00102
REVISION: P02
DATE: 28/03/2025
DRAWN: CT
SCALE: 1:3500

SCALE BAR: 0 200m

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Meeting:	*Meeting with Buckinghamshire LLFA*
Date and time:	*10:00 19th February 2025*
Location:	*Microsoft Teams*
Attendees:	[redacted] *(RSK Environment – EIA)* [redacted] *(RSK LDE – Hydrologist lead)* [redacted] *(RSK LDE – Hydrologist)* [redacted] *(Buckinghamshire Council LLFA SuDS Team Leader)* [redacted] *(Buckinghamshire Council Sustainable Drainage officer)*

Item	Actions and responsibility

Introductions

Introductions and Project update.

The project is moving into design freeze stage for the DCO application and are looking to have further consultation to understand feedback from statutory consultees and how this can be incorporated into the evolving design.

DCO application submission is expected Q4 2025.

This is the third meeting with the LLFA, the first in May and second in December 2024.

LLFA comments on PEIR:

118	pg. 23	Water	The Council as the Lead Local Flood Authority (LLFA) has reviewed the Preliminary Environmental Information Report (Chapter 15), the associated appendices Volume 2	Noted.

			(supporting Figures) and Volume 3 (supporting reports)	
119	pg. 23 & 24	Water	Flood Risk Assessment: • The PEIR appropriately uses publicly available datasets to establish the current baseline for flood risk and water quality. • However, it lacks additional surveys, site investigations, or hydraulic modelling to enhance the current baseline data. • The current fluvial flood risk is defined using the Flood Map for Planning, focusing on Parcels 1a and 3. • Future fluvial flood risk should consider discrete flood modelling exercises, especially for key watercourses like Muxwell Brook and Claydon Brook.	Further flood modelling will inform the ES.
120	pg. 24	Water	Surface Water Management: • Surface water flood risk is assessed using the EA RofSW mapping. • The Buckinghamshire Council's Local Flood Risk Management Strategy includes updated surface water flood risk mapping. • The PEIR suggests that once vegetation is established beneath the solar arrays, there will not be a significant increase in surface water runoff. • The document highlights the risk of increased silt-laden runoff during construction and commissioning stages.	Noted
121	pg. 24	Water	• The PEIR outlines embedded mitigation measures to avoid significant flood risk effects, including locating key components outside defined flood risk areas.	Noted

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			• The LLFA agrees with the proposed mitigation measures but finds the proposed minimum offsets from watercourses (10m from Main Rivers and 6m from Ordinary Watercourses) unacceptable.	
122	pg. 24	Water	• The integration of SuDS features within ecological buffer strips along watercourses is recommended to ensure runoff is captured and treated before entering watercourses.	Noted and to be considered within the design that will be issued as part of the DCO application
123	pg. 24	Water	• Assumptions are made that vegetation cover will reduce surface runoff after agricultural activities cease at the solar farm.	Noted.
124	pg. 24	Water	• The North Bucks Freshwater Resilience Project should be considered in developing detailed proposals.	Noted. Engagement to be undertaken.
125	pg. 24	Water	The Council emphasises the need for additional surveys and site-specific modelling. The proposed embedded mitigation measures are broadly acceptable; however, the Council recommends revising the minimum offsets from watercourses and integrating SuDS features within ecological buffer strips. The Council advises considering the North Bucks Freshwater Resilience Project in the detailed proposals.	Noted. Engagement to be undertaken.

Update on modelling

Rosefield has gained agreement to be able to use the model the Statera BESS scheme have issued, which has subsequently signed off by the Environment Agency (EA). This covers the northern part of Claydon Brook in the northeastern site area. Rosefield will review the data to

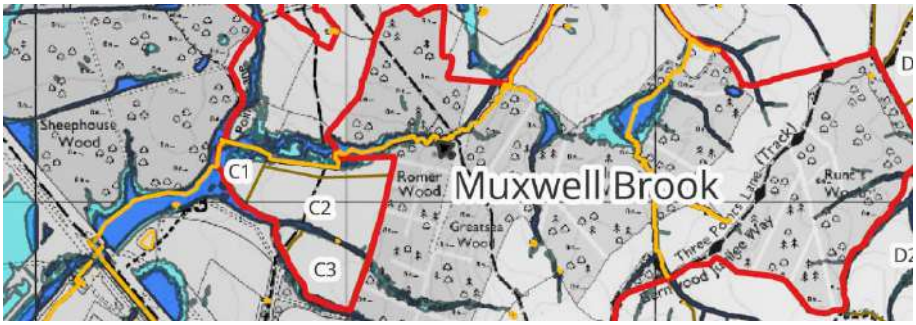
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understand if further modelling in the southern areas is required. Discussions with the EA are still ongoing.

The release of the updated surface water flood data has been noted and compared with the previous flood data. For Rosefield, there is not a significant difference and therefore it is considered appropriate to use this data as a proxy. The LLFA had no objections to this.

Rosefield is adopting the sequential approach to design, however, there are some potential conflicts between the scheme design and flood zones. These are mainly around access tracks. For temporary tracks, track matting will likely be used while for permanent tracks, these will be set at a grade. The LLFA had no issues with this.

The LLFA's main concern is that we can provide a robust technical argument that further modelling will not be required. They are interested in how the zone of influence, particularly of Muxwell Brook in the south, impacts the scheme.



The LLFA were pleased to hear that Parcel 1a (C1 C2 and C3 as per above) was not being developed and pointed out the opportunity for natural flood management in this area.

As no development is put forward around Muxwell Brook, there will be no change in levels and the LLFA were happy that modelling will not be required here. However, they would like to ensure that any temporary impacts (such as cabling), are properly addressed.

The LLFA mentioned that there are issues within the wider Muxwell Brook catchment further south of our site, mainly associated with HS2. RSL confirmed that the existing status quo within the Muxwell Brook catchment, and, where feasible, will look to use natural flood management to help reduce flood risk downstream as part of BNG enhancements.

Watercourse easement requirements. Ecology/IDB conflicts

Rosefield have engaged with the Internal Drainage Board (IDB) who have provided comment on the setbacks. IDB were happy that the

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current setbacks on their watercourses of 9m was enough to allow them to access the banks for maintenance.

The LLFA is responsible for any in channel works, culverting etc. Whilst the LLFA have no power to enforce easements, they would be content with the 9m easement to be consistent with the IDB requirements. RSK pointed out that easements are required for both maintenance access (for the IDB) and ecology related easements to preserve riparian habitats, with can sometimes give rise to conflicts.

The LLFA did state that any ditches that start within Rosefield's red line boundary, and did not pick up any offsite flood routes, can be incorporated into the Drainage Strategy, however, those that start outside the red line boundary, or pick up flood routes, may require additional assessment.

North Bucks Freshwater Resilience Project

[redacted] will provide a contact at the Resilience Project for us to potentially engage with.

There is not anything on the Resilience Project's website specific to the catchment Rosefield is located in. The LLFA think that they would be open to partnering with Rosefield.

The LLFA believe that the Resilience Project would be pleased to hear that Parcel 1a is set aside for ecological enhancement and that there is an opportunity here for implementing natural flood management.

Next steps

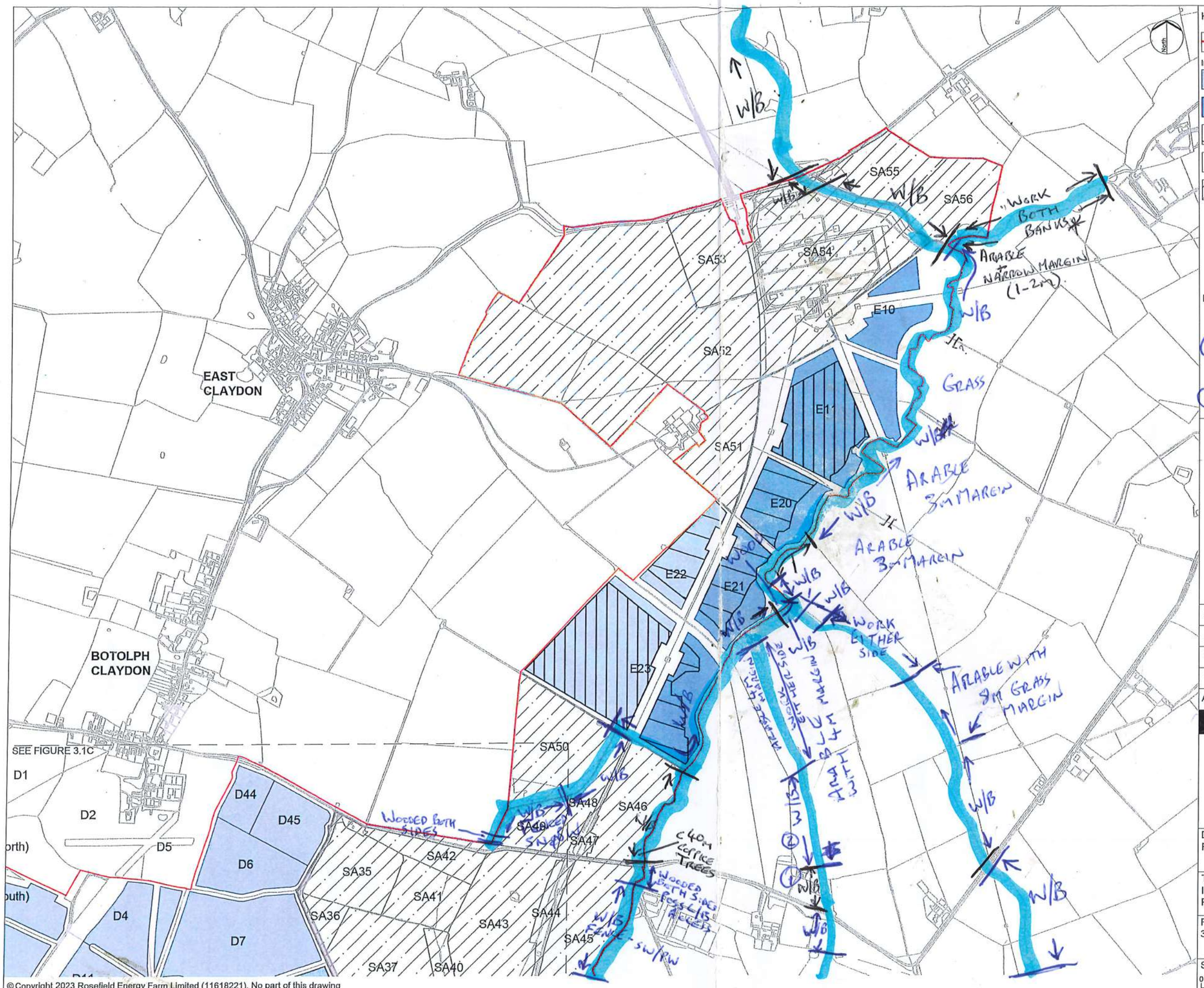
RSK to send over clarification to the LLFA on the main agreement for modelling, easements, and the North Buckinghamshire Freshwater Resilience Project.

RSK to review flood risk and drainage once the Rosefield design has been fixed and the drainage strategy has been incorporated. Another meeting will then be set up with the LLFA to discuss this.

AOB

None.

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KEY:

- Indicative Site Boundary

Indicative maximum height above ground level (meters)

- Proposed development up to 3.5m
- Proposed development up to 4.5m
- Proposed siting zone for elements up to 6m
- Proposed siting zone for elements up to 15m
- Area for underground cable routes, access tracks and temporary construction compounds (locations to be determined)

* RIGHT BANK IS ALL GRASS BUT HAS SOME LONG STANDS OF HEDGING. MAY NEED TO SNAP SIDES AS NECESSARY.

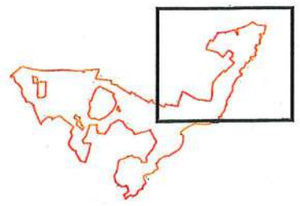
NOTES:

1. Refer to Figure 3.1A for drawing notes.

(1) DENSE COPSE BOTH SIDES HANDWORK ONLY OR CLEAR ONE SIDE

(2) WILL NEED CLEARING. MOSTLY BRASH & BRAMBLE. GRASS FIELD

KEY PLAN:



04	08/08/2024	PEIR issue	LDA	RK	RK
03	05/07/2024	Third Draft	LDA	RK	RK
02	25/06/2024	Second Draft	LDA	RK	RK
01	17/05/2024	First Draft	LDA	RK	RK
App	Date	Description	Drn	Chk	App

Rosefield Solar Farm

Rosefield Solar Farm

DOCUMENT:
ROSEFIELD SOLAR FARM

TITLE:
INDICATIVE HEIGHT PARAMETERS
PARCEL 3

FIGURE NUMBER:
3.1D

SCALE : 1:10,000 @ A3

0 500m

REV: P04

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Annex D
Surface Water Storage Calculations



Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	05/06/2025
Calculated by	[redacted]
Reference	Rosefield
Model version	2.0.1

Location

Site name	Rosefield Solar Farm
Site location	Buckingham



Site easting	472234
Site northing	223938

Site details

Total site area (ha)	1 ha

Greenfield runoff

Method

Method	FEH statistical

FEH statistical

	My value		Map value
SAAR (mm)	634 mm		634
BFIHOST	0.225		
QMed-QBar conversion	1.136		1.136
QMed (l/s)	4.1 l/s		
QBar (FEH statistical) (l/s)	4.7 l/s		

Growth curve factors

	My value		Map value
Hydrological region	6		6
1 year growth factor	0.85		
2 year growth factor	0.88		
10 year growth factor	1.62		
30 year growth factor	2.3		
100 year growth factor	3.19		
200 year growth factor	3.74		

Results

Method	FEH statistical
Flow rate 1 year (l/s)	4 l/s
Flow rate 2 year (l/s)	4.1 l/s
Flow rate 10 years (l/s)	7.6 l/s
Flow rate 30 years (l/s)	10.7 l/s
Flow rate 100 years (l/s)	14.9 l/s
Flow rate 200 years (l/s)	17.4 l/s

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.0.1) developed by HR Wallingford and available at uksuds.com (https://www.uksuds.com/). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (https://www.uksuds.com/terms-conditions). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Surface water storage volume design tool

www.uksuds.com | Surface water storage volume design tool (https://www.uksuds.com/)

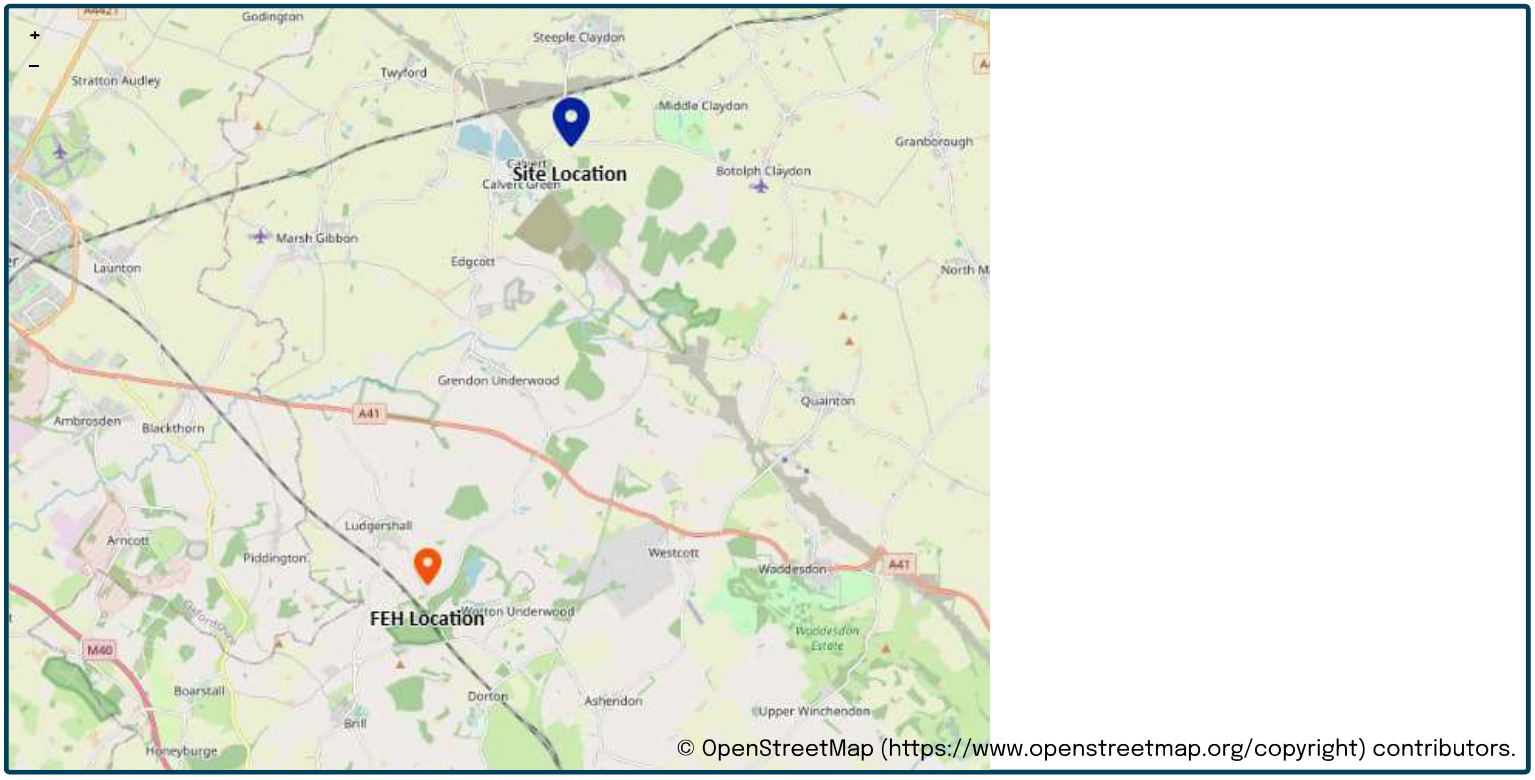
This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is recommended that the total storage volume for the site is distributed across the site using multiple SuDS and that hydraulic modelling software is used to undertake and finalise the detailed design of the drainage system.

Project details

Date	29/07/2025
Calculated by	[redacted]
Reference	Rosefield Solar Farm
Model version	2.1.2

Location

Site name	Parcel 1
Site location	Calder



Site easting (British National Grid)	469643
Site northing (British National Grid)	224525

Site areas

Total site area (ha)	183	ha

Roof area

Total roof area (ha)	0	ha
Contributing roof area (ha)	0	ha
Non-contributing roof area (ha)	0	ha

Paved area

Total paved area (ha)	11.3	ha
Contributing paved area (ha)	11.3	ha
Non-contributing paved area (ha)	0	ha

Grass / vegetated area

Total grass / vegetated area (ha)	164.7	ha
Contributing grass / vegetated area (ha)	7	ha
Non-contributing grass / vegetated area (ha)	157.7	ha

Total area

Total contributing area (ha)	18.3	ha

Contributing areas with urban creep allowance

Urban creep allowance factor	+0% (no creep)

Storage design parameters

Storage base shape	Circular	
Storage design depth (m)	0.5	m
Storage side slope (1 in x)	1 in 3	
Storage voids ratio (%)	100% (all voids)	
Storage volume design return period (years)	1:100 years	

Discharge flow rate from the site

Method

Type of site	Greenfield
Specify the method	User specified

User specified discharge

Flow rate (user specified) (l/s)	73.2 l/s

Final discharge rate

Runoff calculation method	User specified
Design flow rate (l/s)	73.2 l/s

Blockage risk

Specify the method	Flow rate
Minimum discharge flow rate to prevent blockage	2l/s

	My value	Calculated value
Design orifice diameter (mm)	238 mm	238
Flow rate of orifice (l/s)	73.11 l/s	

Rainfall and runoff

Rainfall input type	FEH22 CSV file
	close to rosefield FEH_Point_Rainfall_FEH22_AM_466995_215817.csv
Distance from FEH location to site (km)	9.1 km
Climate change allowance factor	125%
Specify the runoff method from grass / vegetated areas	Fixed percentage - based on rainfall event depth and SPR

	My value	Map value
How should SPR be derived?	Estimate using BFI	
BFIHOST	0.225	
SPR	0.57	

Model results

- **Maximum discharge flow rate:** 73.1 (l/s)
- **Outflow orifice diameter:** 238 (mm)
- **Storage base diameter:** 182 (m)
- **Storage base area:** 26110 (m^2)
- **Storage total volume:** 13258 (m^3)
- **Storage total water volume:** 13258 (m^3)
- **Storm return periods run:** 1, 2, 10, 30, 100, 200 (years)
- **Storm durations run:** 15, 30, 60, 120, 180, 240, 360, 540, 720, 900, 1080, 1440, 1800, 2160, 2880, 3600, 4320, 5040, 5760 (minutes)

Return Period (years)	Critical Duration (minutes)	Peak Flow Rate (l/s)	Max Depth (m)	Max water volume (m^3)	Max storage volume (m^3)
1	5760	28.0	0.18	4832	4832
2	5760	33.6	0.21	5457	5457
10	1440	52.0	0.31	8220	8220
30	1080	62.2	0.39	10429	10429
100	1080	73.1	0.50	13258	13258
200	900	79.6	0.57	15184	15184

Please note runoff estimation and storage volume estimation are subject to uncertainty. Storage volume results are therefore reported to the nearest 1 m^3 value, unless storage volumes are less than 10 m^3, in which case, storage volumes are provided to 1 decimal place.

Disclaimer

This report was produced using the surface water storage volume design tool (2.1.2) developed by HR Wallingford and available at uksuds.com (https://www.uksuds.com/). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (https://www.uksuds.com/terms-conditions). The outputs from this tool have been used to estimate surface water storage volumes for the whole site based on a limiting discharge rate from the site. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

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Appendix A - Rainfall Depths

Rainfall depths (mm) with climate change

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
15	0.25	6.61	9.39	20.36	27.40	35.20	39.98
30	0.5	8.44	12.01	26.20	35.65	46.09	52.47
60	1	10.50	14.89	32.33	43.96	57.30	65.49
120	2	16.18	21.20	40.88	53.72	68.44	77.58
180	3	19.70	25.04	45.86	59.42	75.06	84.94
240	4	22.15	27.70	49.31	63.32	79.67	90.14
360	6	25.32	31.16	53.88	68.41	85.84	97.19
540	9	28.40	34.49	58.08	73.29	91.81	104.06
720	12	30.54	36.79	60.98	76.66	95.90	108.67
900	15	32.13	38.51	63.22	79.25	98.92	111.96
1080	18	33.48	39.96	65.10	81.36	101.34	114.59
1440	24	35.83	42.46	68.21	84.77	105.13	118.77
1800	30	37.80	44.56	70.79	87.56	108.07	121.82
2160	36	39.56	46.45	73.08	90.02	110.63	124.39
2880	48	42.77	49.88	77.19	94.44	115.09	128.72
3600	60	45.88	53.16	81.06	98.59	119.22	132.69
4320	72	48.87	56.30	84.75	102.51	123.09	136.35
5040	84	51.75	59.33	88.30	106.30	126.79	139.84
5760	96	54.57	62.27	91.76	109.99	130.36	143.20

Rainfall depths (mm) without climate change

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
15	0.25	5.29	7.51	16.29	21.92	28.16	31.98
30	0.5	6.75	9.61	20.96	28.52	36.87	41.98
60	1	8.40	11.91	25.86	35.17	45.84	52.39
120	2	12.95	16.96	32.70	42.98	54.75	62.06
180	3	15.76	20.03	36.69	47.54	60.05	67.95
240	4	17.72	22.16	39.45	50.66	63.74	72.11
360	6	20.26	24.93	43.10	54.73	68.67	77.75
540	9	22.72	27.59	46.46	58.63	73.45	83.25
720	12	24.43	29.43	48.78	61.33	76.72	86.94
900	15	25.71	30.81	50.58	63.40	79.14	89.57
1080	18	26.79	31.97	52.08	65.09	81.07	91.67
1440	24	28.67	33.97	54.57	67.82	84.10	95.02
1800	30	30.24	35.65	56.63	70.05	86.46	97.46

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
2160	**36**	31.65	37.16	58.46	72.02	88.50	99.51
2880	**48**	34.21	39.90	61.75	75.55	92.07	102.98
3600	**60**	36.71	42.53	64.85	78.87	95.38	106.15
4320	**72**	39.09	45.04	67.80	82.01	98.47	109.08
5040	**84**	41.40	47.46	70.64	85.04	101.43	111.87
5760	**96**	43.65	49.82	73.41	87.99	104.29	114.56

Surface water storage volume design tool

www.uksuds.com | Surface water storage volume design tool (https://www.uksuds.com/)

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is recommended that the total storage volume for the site is distributed across the site using multiple SuDS and that hydraulic modelling software is used to undertake and finalise the detailed design of the drainage system.

Project details

Date	30/07/2025
Calculated by	[redacted]
Reference	Rosefield Solar Farm
Model version	2.1.2

Location

Site name	Parcel 2, BESS
Site location	Middle Claydon



Site easting (British National Grid)	473681
Site northing (British National Grid)	223672

Site areas

Total site area (ha)	10.5	ha

Roof area

Total roof area (ha)	0.5	ha
Contributing roof area (ha)	0.5	ha
Non-contributing roof area (ha)	0	ha

Paved area

Total paved area (ha)	5.22	ha
Contributing paved area (ha)	5.22	ha
Non-contributing paved area (ha)	0	ha

Grass / vegetated area

Total grass / vegetated area (ha)	0	ha
Contributing grass / vegetated area (ha)	0	ha
Non-contributing grass / vegetated area (ha)	0	ha

Total area

Total contributing area (ha)	5.72	ha

Contributing areas with urban creep allowance

Urban creep allowance factor	+0% (no creep)

Storage design parameters

Storage base shape	Circular	
Storage design depth (m)	1	m
Storage side slope (1 in x)	1 in 3	
Storage voids ratio (%)	100% (all voids)	
Storage volume design return period (years)	1:100 years	

Discharge flow rate from the site

Method

Type of site	Greenfield
Specify the method	User specified

User specified discharge

Flow rate (user specified) (l/s)	22.9 l/s

Final discharge rate

Runoff calculation method	User specified
Design flow rate (l/s)	22.9 l/s

Blockage risk

Specify the method	Flow rate
Minimum discharge flow rate to prevent blockage	2l/s

	My value		Calculated value
Design orifice diameter (mm)	106 mm		106
Flow rate of orifice (l/s)	22.86 l/s		

Rainfall and runoff

Rainfall input type	FEH22 CSV file
	close to rosefield FEH_Point_Rainfall_FEH22_AM_466995_215817.csv
Distance from FEH location to site (km)	10.3 km
Climate change allowance factor	125%

Model results

- **Maximum discharge flow rate:** 22.9 (l/s)
- **Outflow orifice diameter:** 106 (mm)
- **Storage base diameter:** 76 (m)
- **Storage base area:** 4502 (m^2)
- **Storage total volume:** 4863 (m^3)
- **Storage total water volume:** 4863 (m^3)
- **Storm return periods run:** 1, 2, 10, 30, 100, 200 (years)
- **Storm durations run:** 15, 30, 60, 120, 180, 240, 360, 540, 720, 900, 1080, 1440, 1800, 2160, 2880, 3600, 4320, 5040, 5760 (minutes)

Return Period (years)	Critical Duration (minutes)	Peak Flow Rate (l/s)	Max Depth (m)	Max water volume (m^3)	Max storage volume (m^3)
1	1800	12.2	0.32	1480	1480
2	1440	13.5	0.38	1777	1777
10	1080	17.9	0.64	3005	3005
30	900	20.3	0.80	3831	3831
100	900	22.9	1.00	4863	4863
200	900	24.4	1.13	5553	5553

Please note runoff estimation and storage volume estimation are subject to uncertainty. Storage volume results are therefore reported to the nearest 1 m^3 value, unless storage volumes are less than 10 m^3, in which case, storage volumes are provided to 1 decimal place.

Disclaimer

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Surface water storage volume design tool

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is recommended that the total storage volume for the site is distributed across the site using multiple SuDS and that hydraulic modelling software is used to undertake and finalise the detailed design of the drainage system.

Project details

Date	30/07/2025
Calculated by	[redacted]
Reference	Rosefield Solar Farm
Model version	2.1.2

Location

Site name	Parcel 3, Main Collector Compound
Site location	East Claydon



Site easting (British National Grid)	474908
Site northing (British National Grid)	225050

Site areas

Total site area (ha)	2.5	ha

Roof area

Total roof area (ha)	0.5	ha
Contributing roof area (ha)	0.5	ha
Non-contributing roof area (ha)	0	ha

Paved area

Total paved area (ha)	0.75	ha
Contributing paved area (ha)	0.75	ha
Non-contributing paved area (ha)	0	ha

Grass / vegetated area

Total grass / vegetated area (ha)	0	ha
Contributing grass / vegetated area (ha)	0	ha
Non-contributing grass / vegetated area (ha)	0	ha

Total area

Total contributing area (ha)	1.25	ha

Contributing areas with urban creep allowance

Urban creep allowance factor	+0% (no creep)

Storage design parameters

Storage base shape	Circular	
Storage design depth (m)	1	m
Storage side slope (1 in x)	1 in 3	
Storage voids ratio (%)	100% (all voids)	
Storage volume design return period (years)	1:100 years	

Discharge flow rate from the site

Method

Type of site	Greenfield
Specify the method	User specified

User specified discharge

Flow rate (user specified) (l/s)	5 l/s

Final discharge rate

Runoff calculation method	User specified
Design flow rate (l/s)	5 l/s

Blockage risk

Specify the method	Flow rate
Minimum discharge flow rate to prevent blockage	2l/s

	My value	Calculated value
Design orifice diameter (mm)	49 mm	49
Flow rate of orifice (l/s)	4.96 l/s	

Rainfall and runoff

Rainfall input type	FEH22 CSV file
	close to rosefield FEH_Point_Rainfall_FEH22_AM_466995_215817.csv
Distance from FEH location to site (km)	12.2 km
Climate change allowance factor	125%

Model results

- **Maximum discharge flow rate:** 5.0 (l/s)
- **Outflow orifice diameter:** 49 (mm)
- **Storage base diameter:** 34 (m)
- **Storage base area:** 891 (m^2)
- **Storage total volume:** 1059 (m^3)
- **Storage total water volume:** 1059 (m^3)
- **Storm return periods run:** 1, 2, 10, 30, 100, 200 (years)
- **Storm durations run:** 15, 30, 60, 120, 180, 240, 360, 540, 720, 900, 1080, 1440, 1800, 2160, 2880, 3600, 4320, 5040, 5760 (minutes)

Return Period (years)	Critical Duration (minutes)	Peak Flow Rate (l/s)	Max Depth (m)	Max water volume (m^3)	Max storage volume (m^3)
1	1440	2.8	0.33	312	312
2	1080	3.1	0.40	379	379
10	900	4.0	0.65	651	651
30	900	4.5	0.81	833	833
100	900	5.0	1.00	1059	1059
200	900	5.3	1.12	1211	1211

Please note runoff estimation and storage volume estimation are subject to uncertainty. Storage volume results are therefore reported to the nearest 1 m^3 value, unless storage volumes are less than 10 m^3, in which case, storage volumes are provided to 1 decimal place.

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Surface water storage volume design tool

www.uksuds.com | Surface water storage volume design tool (https://www.uksuds.com/)

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Project details

Date	30/07/2025
Calculated by	[redacted]
Reference	Rosefield Solar Farm
Model version	2.1.2

Location

Site name	Parcel 3, Substation
Site location	East Claydon



Site easting (British National Grid)	475178
Site northing (British National Grid)	225236

Site areas

Total site area (ha)	6	ha

Roof area

Total roof area (ha)	0.6	ha
Contributing roof area (ha)	0.6	ha
Non-contributing roof area (ha)	0	ha

Paved area

Total paved area (ha)	1.5	ha
Contributing paved area (ha)	1.5	ha
Non-contributing paved area (ha)	0	ha

Grass / vegetated area

Total grass / vegetated area (ha)	0	ha
Contributing grass / vegetated area (ha)	0	ha
Non-contributing grass / vegetated area (ha)	0	ha

Total area

Total contributing area (ha)	2.1	ha

Contributing areas with urban creep allowance

Urban creep allowance factor	+0% (no creep)

Storage design parameters

Storage base shape	Rectangular / square	
Storage base length to width ratio	3:1	
Storage design depth (m)	1	m
Storage side slope (1 in x)	Vertical sided	
Storage voids ratio (%)	90% (e.g. geocellular crate systems)	
Storage volume design return period (years)	1:100 years	

Discharge flow rate from the site

Method

Type of site	Greenfield
Specify the method	User specified

User specified discharge

Flow rate (user specified) (l/s)	8.4 l/s

Final discharge rate

Runoff calculation method	User specified
Design flow rate (l/s)	8.4 l/s

Blockage risk

Specify the method	Flow rate
Minimum discharge flow rate to prevent blockage	2l/s

	My value	Calculated value
Design orifice diameter (mm)	63 mm	63
Flow rate of orifice (l/s)	8.17 l/s	

Rainfall and runoff

Rainfall input type	FEH22 CSV file
	close to rosefield FEH_Point_Rainfall_FEH22_AM_466995_215817.csv
Distance from FEH location to site (km)	12.5 km
Climate change allowance factor	125%

Model results

- **Maximum discharge flow rate:** 8.2 (l/s)
- **Outflow orifice diameter:** 63 (mm)
- **Storage base length:** 77 (m)
- **Storage base width:** 26 (m)
- **Storage base area:** 1992 (m^2)
- **Storage total volume:** 1992 (m^3)
- **Storage total water volume:** 1793 (m^3)
- **Storm return periods run:** 1, 2, 10, 30, 100, 200 (years)
- **Storm durations run:** 15, 30, 60, 120, 180, 240, 360, 540, 720, 900, 1080, 1440, 1800, 2160, 2880, 3600, 4320, 5040, 5760 (minutes)

Return Period (years)	Critical Duration (minutes)	Peak Flow Rate (l/s)	Max Depth (m)	Max water volume (m^3)	Max storage volume (m^3)
1	1800	4.3	0.30	543	603
2	1440	4.8	0.36	654	727
10	1080	6.4	0.62	1109	1232
30	900	7.2	0.79	1413	1570
100	900	8.2	1.00	1793	1992
200	900	8.7	1.13	2047	2274

Please note runoff estimation and storage volume estimation are subject to uncertainty. Storage volume results are therefore reported to the nearest 1 m^3 value, unless storage volumes are less than 10 m^3, in which case, storage volumes are provided to 1 decimal place.

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Annex E
Outline Drainage Strategy Drawings and Cross Section



CATCHMENT 1A TOTAL AREA: 36 HA
TOTAL ROAD AREA: 0.8HA

CATCHMENT 1B TOTAL AREA: 75.3 HA
TOTAL ROAD AREA: 1.5HA

CATCHMENT 1C TOTAL AREA: 41.1HA
TOTAL ROAD AREA 0.8HA

CATCHMENT 1D TOTAL AREA : 22.2 HA
TOTAL ROAD AREA:0.5HA

CATCHMENT 1E TOTAL AREA : 7.99 HA
TOTAL ROAD AREA 0.07HA

B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13 B14 B15 B16 B17 B18 B19 B20 B21 B22 B23 (North) B23 (South)

1 2 3 4

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KEY

- EXISTING WATERBODY
- DIRECTION LAND SLOPES
- CATCHMENT 1A
- CATCHMENT 1B
- CATCHMENT 1C
- CATCHMENT 1D
- CATCHMENT 1E
- ORDER LIMITS
- 89.50 EXISTING GROUND LEVELS
- INDICATIVE LOCATION OF ATTENUATION FEATURE
- BADGER 30m/50m BUFFER
- HEDGEROW
- HEDGEROW MITIGATION BUFFER
- INDICATIVE ROAD LAYOUT
- INDICATIVE CABLE ROUTE

NOTES:

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2. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL RELEVANT DOCUMENTS, DRAWINGS AND STANDARD DETAILS, WHERE PROVIDED, SPECIFICALLY THE ODS REPORT (EN010158/APP/7.11) TO WHICH THIS DRAWING IS APPENDED TO.
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4. LOCATION OF ATTENUATION FEATURES SHOWN INDICATIVELY ONLY; FINAL SIZE, DEPTH AND CAPACITY WILL BE DEPENDENT ON VARIOUS FACTORS INCLUDING TOPOGRAPHY, SITE SLOPES AND TOTAL ATTENUATION VOLUMES REQUIRED FOLLOWING DESIGN OF THE SWALES AND CUTOFF DITCHES.

REV	Date	Description	Drn	Chk	App
01	Sept 2025	DCO SUBMISSION	RP	AM	VM

Rosefield Solar Farm

Rosefield Solar Farm

DOCUMENT:
OUTLINE DRAINAGE STRATEGY
REGULATION 5(2)(q)

TITLE:
OUTLINE DRAINAGE STRATEGY - PARCEL 1, FULL SITE LAYOUT (1 / 5)

PINS REFERENCE NUMBER:
EN010158/APP/7.11

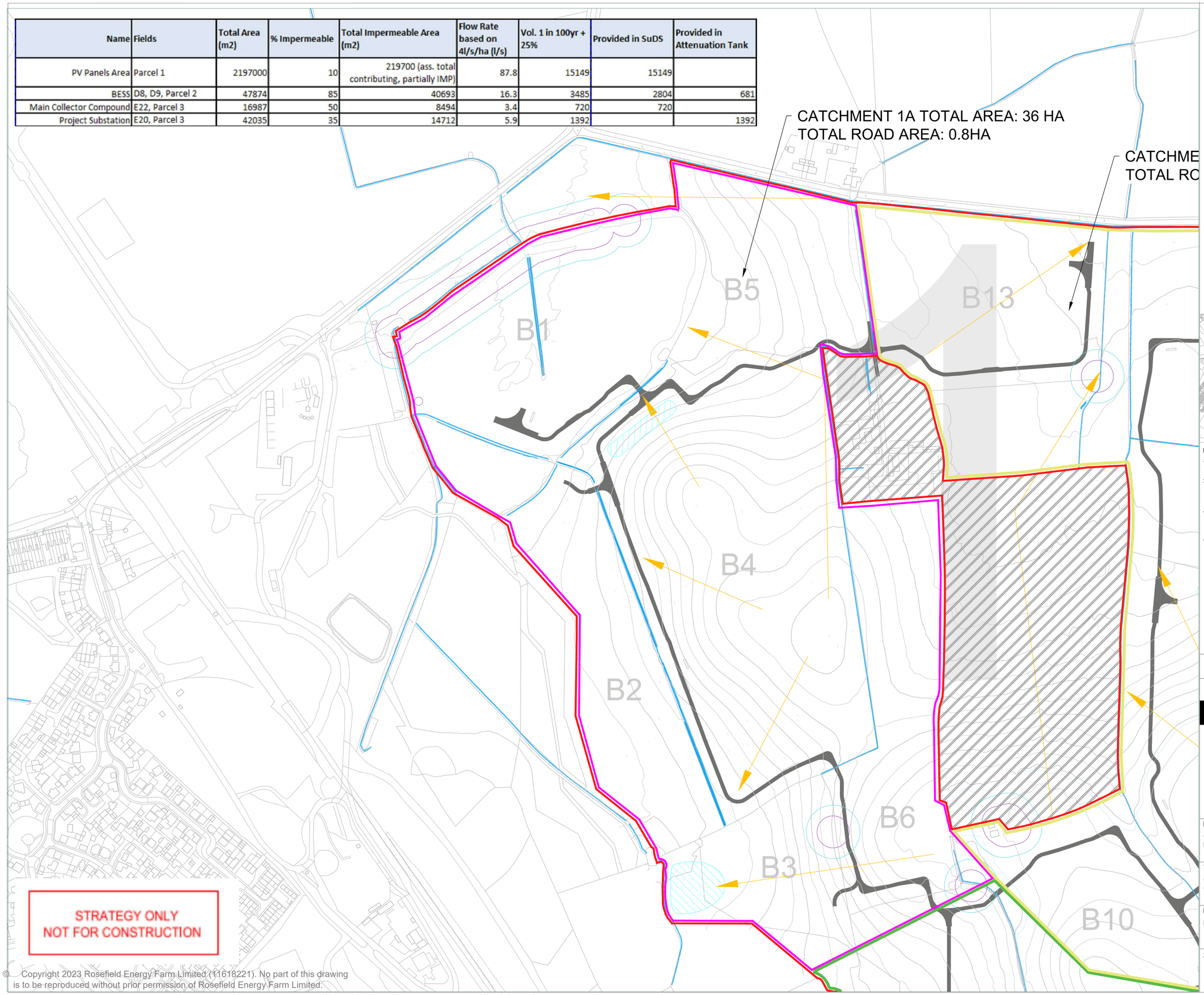
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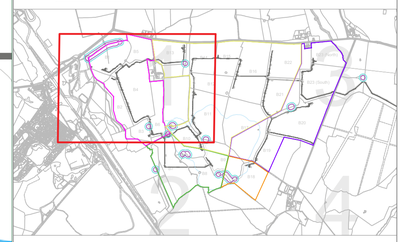
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Name	Fields	Total Area (m2)	% Impermeable	Total Impermeable Area (m2)	Flow Rate based on 4l/s/ha (l/s)	Vol. 1 in 100yr + 25%	Provided in SuDS	Provided in Attenuation Tank
PV Panels Area	Parcel 1	2197000	10	219700 (ass. total contributing, partially IMP)	87.8	15149	15149	
BESS	D8, D9, Parcel 2	47874	85	40693	16.3	3485	2804	681
Main Collector Compound	E22, Parcel 3	16987	50	8494	3.4	720	720	
Project Substation	E20, Parcel 3	42035	35	14712	5.9	1392		1392



KEY

- EXISTING WATERBODY
- DIRECTION LAND SLOPES
- CATCHMENT 1A
- CATCHMENT 1B
- CATCHMENT 1C
- CATCHMENT 1D
- CATCHMENT 1E
- ORDER LIMITS
- 89.50 EXISTING GROUND LEVELS
- INDICATIVE LOCATION OF ATTENUATION FEATURE
- BADGER 30m/50m BUFFER
- HEDGEROW
- HEDGEROW MITIGATION BUFFER
- INDICATIVE ROAD LAYOUT
- INDICATIVE CABLE ROUTE



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REV	Date	Description	Drn	Chk	App
01	Sept 2025	DCO SUBMISSION	RP	AM	VM

Rosefield Solar Farm

Rosefield Solar Farm

DOCUMENT:
OUTLINE DRAINAGE STRATEGY
REGULATION 5(2)(q)

TITLE:
OUTLINE DRAINAGE STRATEGY - PARCEL 1, CATCHMENT A SHEET 2/5

PINS REFERENCE NUMBER:
EN010158/APP/7.11

SCALE : 1:2000 @ A1

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CATCHMENT 1A TOTAL AREA: 36 HA
TOTAL ROAD AREA: 0.8HA

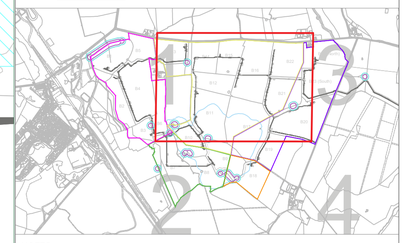
CATCHMENT 1B TOTAL AREA: 75.3 HA
TOTAL ROAD AREA: 1.5HA

B3
B14
B15
B22
B16
B12
B21
B11
B6
B20
B17
B10
B19

100mAOD

KEY

- EXISTING WATERBODY
- DIRECTION LAND SLOPES
- CATCHMENT 1A
- CATCHMENT 1B
- CATCHMENT 1C
- CATCHMENT 1D
- CATCHMENT 1E
- ORDER LIMITS
- 89.50 EXISTING GROUND LEVELS
- INDICATIVE LOCATION OF ATTENUATION FEATURE
- BADGER 30m/50m BUFFER
- HEDGEROW
- HEDGEROW MITIGATION BUFFER
- INDICATIVE ROAD LAYOUT
- INDICATIVE CABLE ROUTE



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REV	Date	Description	Drn	Chk	App
01	Sept 2025	DCO SUBMISSION	RP	AM	VM

Rosefield Solar Farm

Rosefield Solar Farm

DOCUMENT:
OUTLINE DRAINAGE STRATEGY
REGULATION 5(2)(q)

TITLE:
OUTLINE DRAINAGE STRATEGY - PARCEL 1, CATCHMENT B SHEET 3/5

PINS REFERENCE NUMBER:
EN010158/APP/7.11

SCALE : 1:2000 @ A1

0 80m

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Name	Fields	Total Area (m2)	% Impermeable	Total Impermeable Area (m2)	Flow Rate based on 4l/s/ha (l/s)	Vol. 1 in 100yr + 25%	Provided in SuDS	Provided in Attenuation Tank
PV Panels Area	Parcel 1	2197000	10	219700 (ass. total contributing, partially IMP)	87.8	15149	15149	
BESS	D8, D9, Parcel 2	47874	85	40693	16.3	3485	2804	681
Main Collector Compound	E22, Parcel 3	16987	50	8494	3.4	720	720	
Project Substation	E20, Parcel 3	42035	35	14712	5.9	1392		1392

B14 B15 B22 B16 B12 B23 (South) B21 B11 B20 B17 B19

CATCHMENT 1C TOTAL AREA: 41.1HA
TOTAL ROAD AREA 0.8HA

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KEY

- EXISTING WATERBODY
- DIRECTION LAND SLOPES
- CATCHMENT 1A
- CATCHMENT 1B
- CATCHMENT 1C
- CATCHMENT 1D
- CATCHMENT 1E
- ORDER LIMITS
- 89.50 EXISTING GROUND LEVELS
- INDICATIVE LOCATION OF ATTENUATION FEATURE
- BADGER 30m/50m BUFFER
- HEDGEROW
- HEDGEROW MITIGATION BUFFER
- INDICATIVE ROAD LAYOUT
- INDICATIVE CABLE ROUTE

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4. LOCATION OF ATTENUATION FEATURES SHOWN INDICATIVELY ONLY; FINAL SIZE, DEPTH AND CAPACITY WILL BE DEPENDENT ON VARIOUS FACTORS INCLUDING TOPOGRAPHY, SITE SLOPES AND TOTAL ATTENUATION VOLUMES REQUIRED FOLLOWING DESIGN OF THE SWALES AND CUTOFF DITCHES.

REV	Date	Description	Drn	Chk	App
01	Sept 2025	DCO SUBMISSION	RP	AM	VM

Rosefield Solar Farm

DOCUMENT:
OUTLINE DRAINAGE STRATEGY
REGULATION 5(2)(q)

TITLE:
OUTLINE DRAINAGE STRATEGY - PARCEL 1, CATCHMENT C SHEET 4/5

PINS REFERENCE NUMBER:
EN010158/APP/7.11

SCALE : 1:2000 @ A1

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Name	Fields	Total Area (m2)	% Impermeable	Total Impermeable Area (m2)	Flow Rate based on 4l/s/ha (l/s)	Vol. 1 in 100yr + 25%	Provided in SuDS	Provided in Attenuation Tank
PV Panels Area	Parcel 1	2197000	10	219700 (ass. total contributing, partially IMP)	87.8	15149	15149	
BESS	D8, D9, Parcel 2	47874	85	40693	16.3	3485	2804	681
Main Collector Compound	E22, Parcel 3	16987	50	8494	3.4	720	720	
Project Substation	E20, Parcel 3	42035	35	14712	5.9	1392		1392

B21
B11
B6
B3
B17
B10
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B9
B7
B8
B18

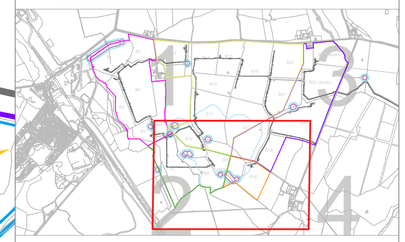
CATCHMENT 1D TOTAL AREA : 22.2 HA
TOTAL ROAD AREA:0.5HA

CATCHMENT 1E TOTAL AREA : 7.99 HA
TOTAL ROAD AREA 0.07HA

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KEY

- EXISTING WATERBODY
- DIRECTION LAND SLOPES
- CATCHMENT 1A
- CATCHMENT 1B
- CATCHMENT 1C
- CATCHMENT 1D
- CATCHMENT 1E
- ORDER LIMITS
- 89.50 EXISTING GROUND LEVELS
- INDICATIVE LOCATION OF ATTENUATION FEATURE
- BADGER 30m/50m BUFFER
- HEDGEROW
- HEDGEROW MITIGATION BUFFER
- INDICATIVE ROAD LAYOUT
- INDICATIVE CABLE ROUTE



NOTES:

1. ALL DIMENSIONS ARE IN MILIMETERES (mm) AND ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM (mAOD) UNLESS STATED OTHERWISE.
2. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL RELEVANT DOCUMENTS, DRAWINGS AND STANDARD DETAILS, WHERE PROVIDED, SPECIFICALLY THE ODS REPORT (EN010158/APP/7.11) TO WHICH THIS DRAWING IS APPENDED TO.
3. THE PRINCIPLES FOR MANAGING OVERLAND SURFACE WATER RUNOFF FROM THE VARIOUS SUBCATCHMENTS WITHIN PARCEL 1 WILL FOLLOW THE EXISTING WATERSHED WITHIN THE SITE TO OUTFALL INTO THE NEARBY NETWORK OF WATERCOURSES AS EXISTING.
4. LOCATION OF ATTENUATION FEATURES SHOWN INDICATIVELY ONLY; FINAL SIZE, DEPTH AND CAPACITY WILL BE DEPENDENT ON VARIOUS FACTORS INCLUDING TOPOGRAPHY, SITE SLOPES AND TOTAL ATTENUATION VOLUMES REQUIRED FOLLOWING DESIGN OF THE SWALES AND CUTOFF DITCHES.

REV	Date	Description	Drn	Chk	App
01	Sept 2025	DCO SUBMISSION	RP	AM	VM

Rosefield Solar Farm

Rosefield Solar Farm

DOCUMENT:
OUTLINE DRAINAGE STRATEGY
REGULATION 5(2)(q)

TITLE:
OUTLINE DRAINAGE STRATEGY - PARCEL 1, CATCHMENT D/E SHEET 5/5

PINS REFERENCE NUMBER:
EN010158/APP/7.11

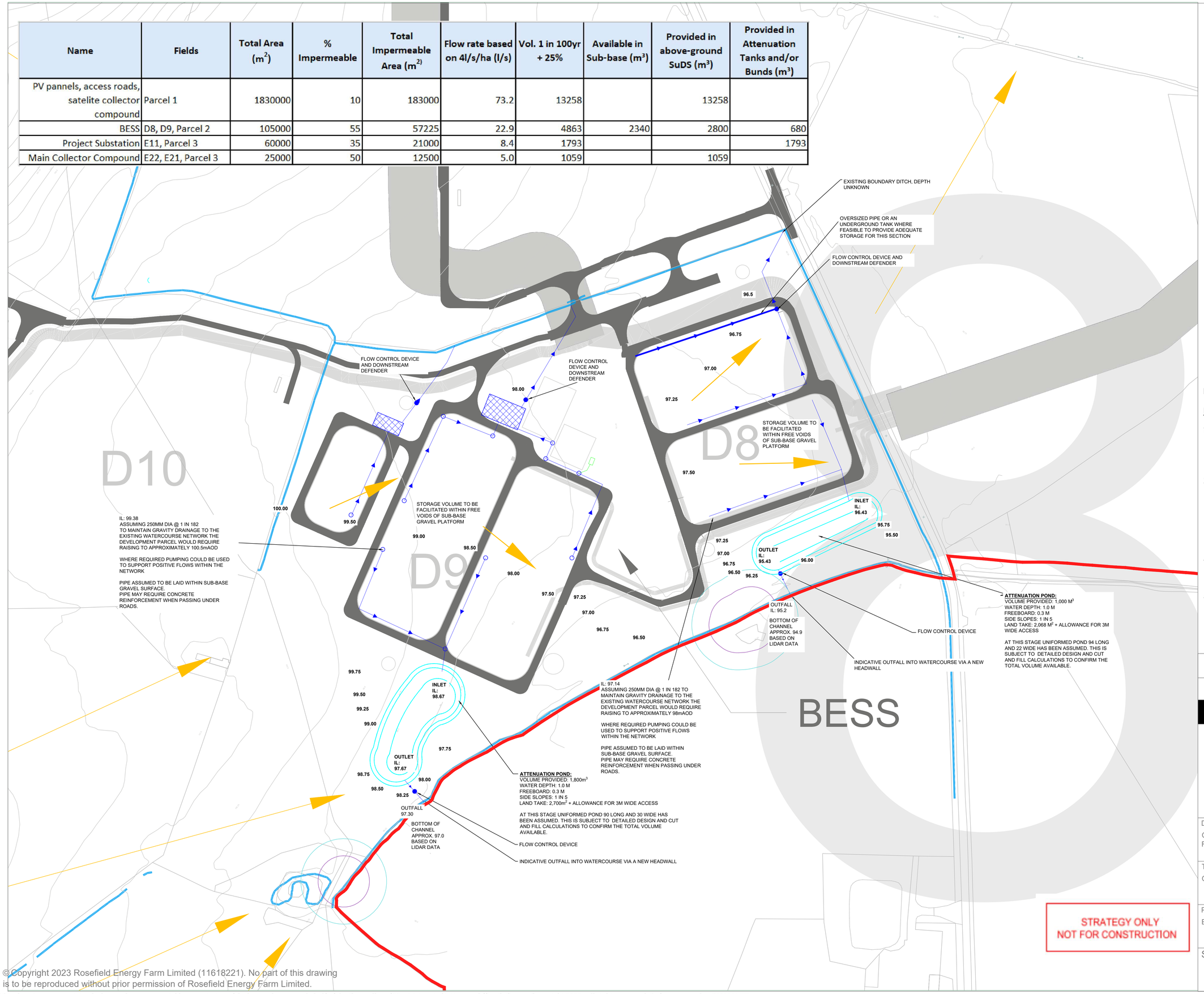
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0 80m

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Name	Fields	Total Area (m^2)	% Impermeable	Total Impermeable Area ($m^{2)}$	Flow rate based on 4l/s/ha (l/s)	Vol. 1 in 100yr + 25%	Available in Sub-base (m^3)	Provided in above-ground SuDS (m^3)	Provided in Attenuation Tanks and/or Bunds (m^3)
PV pannels, access roads, satelite collector compound	Parcel 1	1830000	10	183000	73.2	13258		13258	
BESS	D8, D9, Parcel 2	105000	55	57225	22.9	4863	2340	2800	680
Project Substation	E11, Parcel 3	60000	35	21000	8.4	1793			1793
Main Collector Compound	E22, E21, Parcel 3	25000	50	12500	5.0	1059		1059	



KEY

- ORDER LIMITS
- EXISTING WATERCOURSE
- DIRECTION OF WATERCOURSE
- DIRECTION LAND SLOPES
- 89.50 EXISTING GROUND LEVELS
- SURFACE WATER DRAINAGE
- FLOW CONTROL
- DOWNSTREAM DEFENDER
- SUDS POND
- SWALE
- ATTENUATION TANK
- OILY WATER DRAINAGE
- OILY WATER BUNDED AREA
- OIL INTERCEPTOR
- BADGER 30m/50m BUFFER
- INDICATIVE ROAD LAYOUT
- INDICATIVE CABLE ROUTE

DO NOT SCALE

NOTES:

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3. THIS DRAWING FOCUSES ON FIELDS D8 AND D9 RATHER THAN THE ENTIRE PARCEL 2 AREA
4. THIS DRAINAGE STRATEGY ASSUMES UNIFORMLY SIZED PONDS. POND SIZE IS SUBJECT TO DETAILED DESIGN AND CUT AN FILL CALCULATIONS TO CONFIRM THE TOTAL VOLUME AVAILABLE.

REV	Date	Description	Drn	Chk	App
01	Sept 2025	DCO SUBMISSION	RP	AM	VM

Rosefield Solar Farm

DOCUMENT:
OUTLINE DRAINAGE STRATEGY
REGULATION 5(2)(q)

TITLE:
OUTLINE DRAINAGE STRATEGY - PARCEL 2

PINS REFERENCE NUMBER:
EN010158/APP/7.11

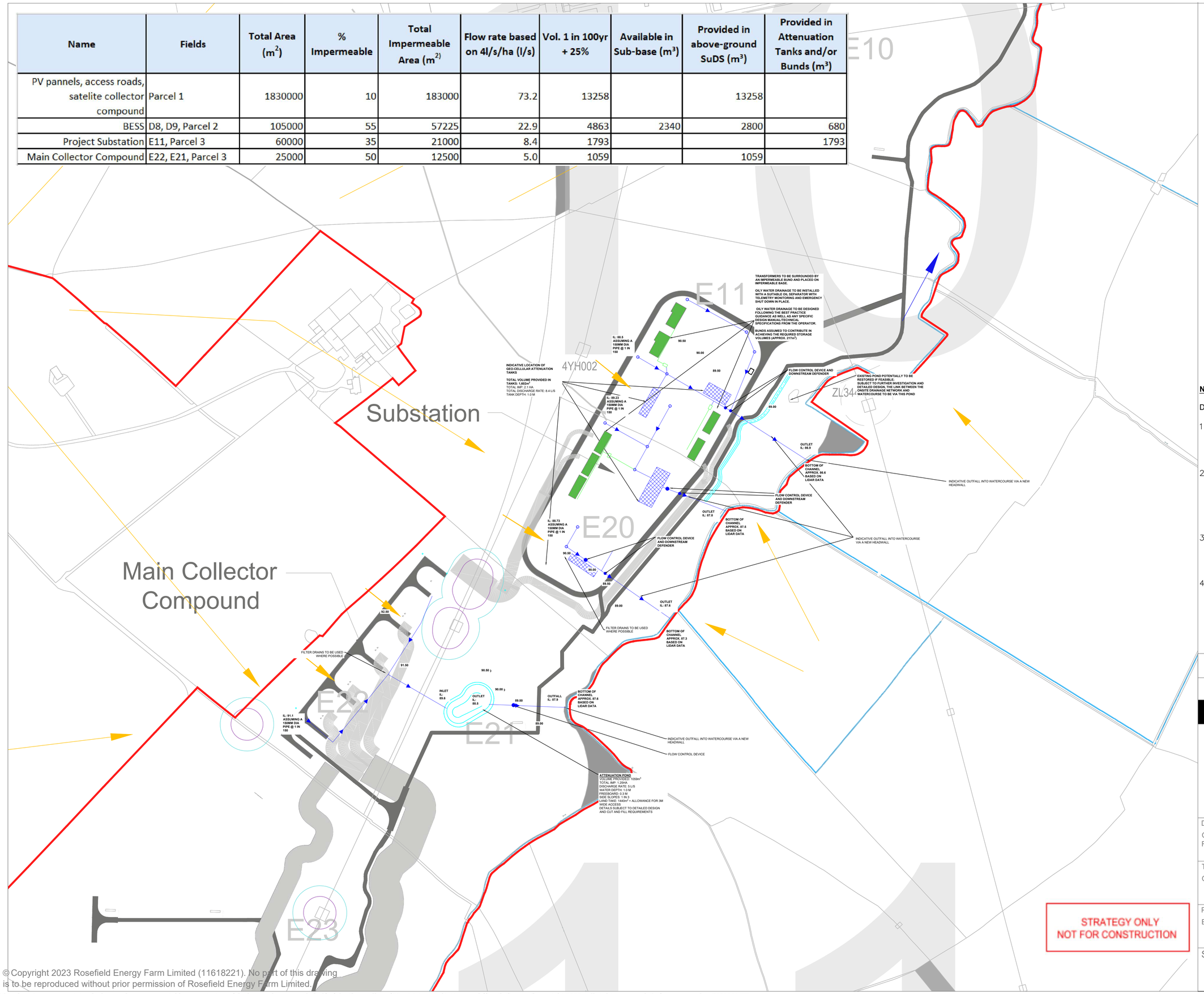
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0 0 200m

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Name	Fields	Total Area (m^2)	% Impermeable	Total Impermeable Area (m^2)	Flow rate based on 4l/s/ha (l/s)	Vol. 1 in 100yr + 25%	Available in Sub-base (m^3)	Provided in above-ground SuDS (m^3)	Provided in Attenuation Tanks and/or Bunds (m^3)
PV pannels, access roads, satelite collector compound	Parcel 1	1830000	10	183000	73.2	13258		13258	
BESS	D8, D9, Parcel 2	105000	55	57225	22.9	4863	2340	2800	680
Project Substation	E11, Parcel 3	60000	35	21000	8.4	1793			1793
Main Collector Compound	E22, E21, Parcel 3	25000	50	12500	5.0	1059		1059	



KEY

- ORDER LIMITS
- EXISTING WATERCOURSE
- DIRECTION OF WATERCOURSE
- DIRECTION LAND SLOPES
- 89.50 EXISTING GROUND LEVELS
- SURFACE WATER DRAINAGE
- FLOW CONTROL
- DOWNSTREAM DEFENDER
- SUDS POND
- SWALE
- ATTENUATION TANK
- OILY WATER DRAINAGE
- OILY WATER BUNDED AREA
- OIL INTERCEPTOR
- BADGER 30m/50m BUFFER
- INDICATIVE ROAD LAYOUT
- INDICATIVE CABLE ROUTE

NOTES

DO NOT SCALE

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3. THIS DRAWING FOCUSES ON FIELDS DESIGNATED FOR ROSEFIELD SUBSTATION AND MAIN COLLECTOR COMPOUND RATHER THAN THE ENTIRE PARCEL 3 AREA.
4. THIS DRAINAGE STRATEGY ASSUMES UNIFORMLY SIZED PONDS. POND SIZE IS SUBJECT TO DETAILED DESIGN AND CUT AN FILL CALCULATIONS TO CONFIRM THE TOTAL VOLUME AVAILABLE.

REV	Date	Description	Dr n	Ch k	App
01	Sept 2025	DCO SUBMISSION	RP	AM	VM

Rosefield Solar Farm

Rosefield Solar Farm

DOCUMENT:
OUTLINE DRAINAGE STRATEGY
REGULATION 5(2)(q)

TITLE:
OUTLINE DRAINAGE STRATEGY - PARCEL 3

PINS REFERENCE NUMBER:
EN010158/APP/7.11

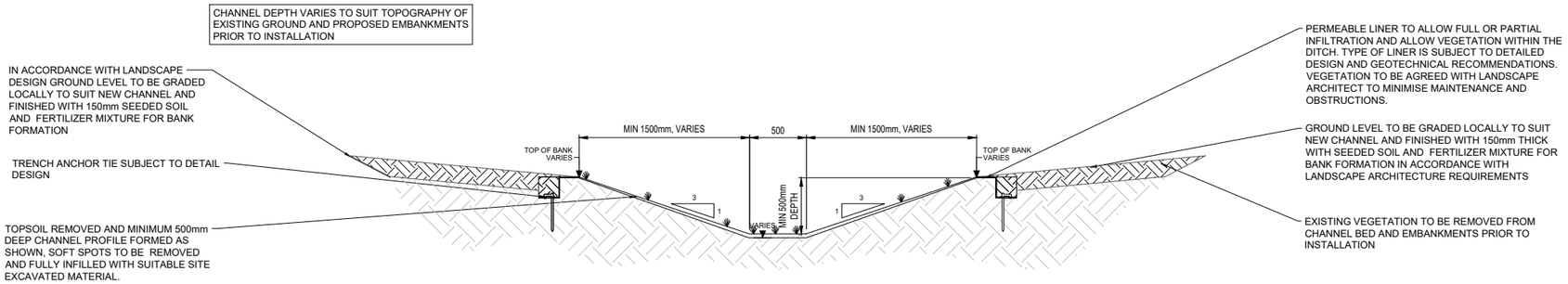
SCALE : 1:2000 @ A1

0 200m

STRATEGY ONLY
NOT FOR CONSTRUCTION

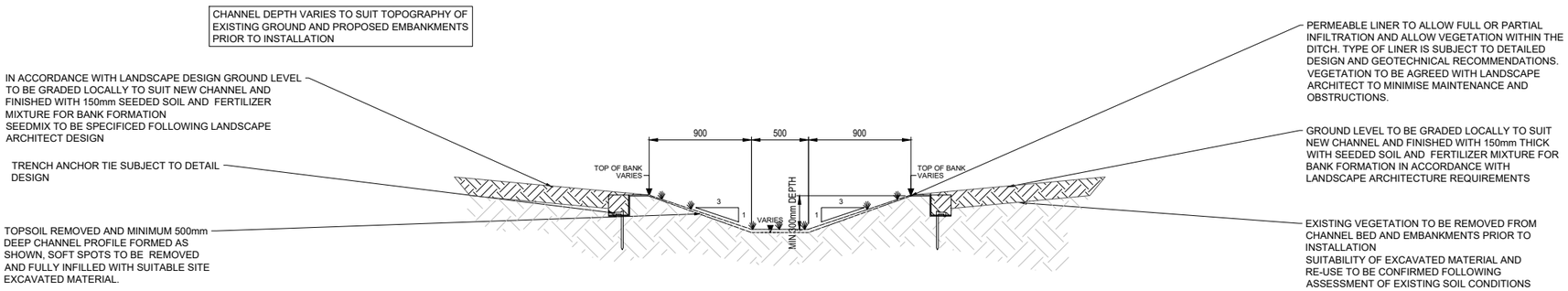
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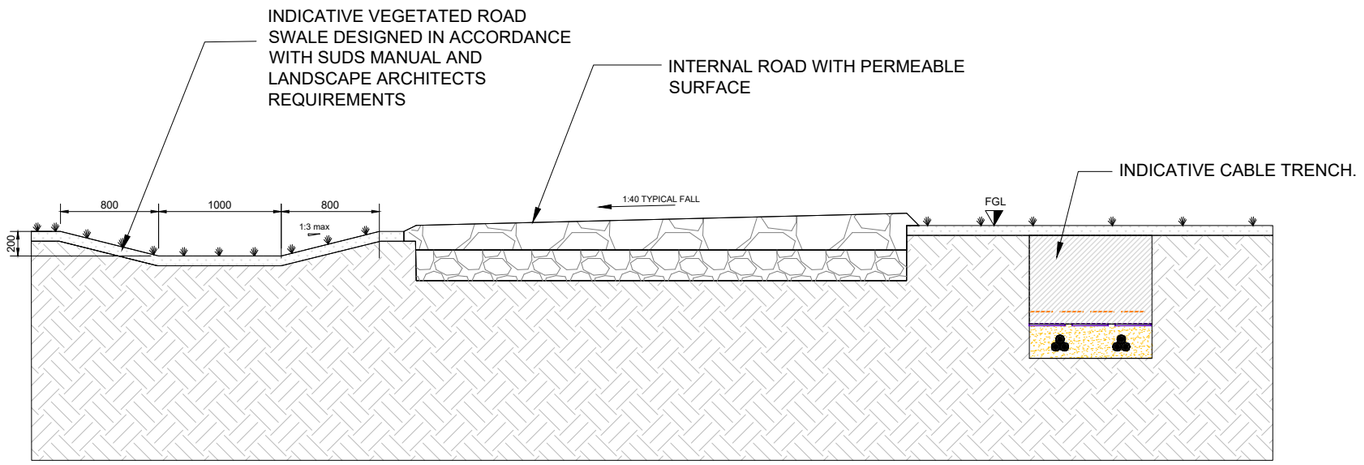
CUT-OFF DITCH TYPICAL TYPE A CROSS SECTION

SCALE 1: 25 @ A1
SCALE 1: 50 @ A3



CUT-OFF DITCH TYPICAL TYPE B CROSS SECTION

SCALE 1: 25 @ A1
SCALE 1: 50 @ A3



TYPICAL INTERNAL ROAD SWALE

SCALE 1: 25 @ A1
SCALE 1: 50 @ A3

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES (mm) AND ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM (mAOD) UNLESS STATED OTHERWISE.
2. DIMENSIONS AND LEVELS SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF THE WORKS.
3. DRAWING IS FOR PLANNING PURPOSES ONLY AND NOT FOR CONSTRUCTION
4. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE OUTLINE DRAINAGE STRATEGY [EN010158/APP/7.11]
5. TYPICAL SWALE AND CUT OFF DITCHES DETAILS SHOWN INDICATIVELY; LOCATION, TYPE AND SIZE OF SWALES TO BE DETERMINED FOLLOWING DETAIL DESIGN, BASED ON CATCHMENT SIZE AND CHARACTERISTICS

REV	Date	Description	Drn	Chk	App
REV01	Sept 2025	DCO SUBMISSION	RP	AM	VM

Rosefield Solar Farm

DOCUMENT:
ENVIRONMENTAL STATEMENT
VOLUME 3: FIGURES
REGULATION 5(2)(a)

TITLE:
FIGURE 3.13: INDICATIVE DRAINAGE CROSS SECTIONS

PINS REFERENCE NUMBER:
EN010158/APP/6.3

SCALE : 1:50 @ A3
0 100mm 200mm

REV01

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Annex F
SuDS Maintenance Checklist



Table 1: SuDS Maintenance Inspection Checklist

GENERAL INFORMATION			
Site ID			
Site Location and co-ordinates (GIS if appropriate)			
Elements forming the SuDS scheme		Approved Drawing Reference(s)	
Inspection frequency		Approved Specification Reference	
Type of development		Specific purpose of any parts of the scheme (e.g. biodiversity, wildlife and visual aspects)	

	Inspection date				**Inspection date**			
	Details	**Y/N**	**Action required**	**Date Completed**	**Details**	**Y/N**	**Action required**	**Date Completed**
GENERAL INSPECTION ITEMS								
Is there any evidence of erosion, channelling, ponding (where not desirable) or other poor hydraulic performance?								
Is there any evidence of accidental spillages, oils, poor water quality, odours, nuisance insects?								
Have any health and safety risks been identified to either the public or maintenance operatives?								
Is there any deterioration in the surface of permeable or porous surfaces (e.g. rutting, spreading of blocks or signs of ponding water)?								

	Inspection date				Inspection date			
	Details	**Y/N**	**Action required**	**Date Completed**	**Details**	**Y/N**	**Action required**	**Date Completed**
SILT/SEDIMENT ACCUMULATION								
Is there any sediment accumulation at inlets (or other defined accumulation zones such as the surface of filter drains or infiltration basins and within proprietary devices)? If yes, state depth (mm) and extent Is removal required? If yes, state waste disposal requirements and confirm all waste management requirements have been complied with (consult Environment Agency or SEPA).								
Is surface clogging visible (potentially problematic where water has to soak into the underlying construction or ground (e.g. under-drained swale or infiltration basin)?								
Does permeable or porous surfacing require sweeping to remove silt?								
SYSTEM BLOCKAGES / LITTER BUILD UP								
Is there evidence of litter accumulation in the system? If yes, is this a blockage risk?								
Is there any evidence of any other clogging/blockage of outlets or drainage paths?								
VEGETATION								

	Inspection date				Inspection date			
	Details	**Y/N**	**Action required**	**Date Completed**	**Details**	**Y/N**	**Action required**	**Date Completed**
Is the vegetation condition satisfactory (density, weed growth, coverage etc.)? (Check against approved planting regime.)								
Does any part of the system require weeding / pruning / mowing? (Check against maintenance frequency stated in approved design.)								
Is there any evidence of invasive species becoming established? If yes, state action required.								
INFRASTRUCTURE								
Are any check dams or weirs in good condition?								
Is there evidence of any accidental damage to the system (e.g. wheel ruts?)								
Is there any evidence of cross connections or other unauthorised inflows?								
Is there any evidence of tampering with the flow controls?								
Are there any other matters that could affect the performance of the system in relation to the design objectives for hydraulic, water quality, biodiversity and visual aspects? (Specify.)								
OTHER OBSERVATIONS								
Information appended (e.g. photos)								

	Inspection date				Inspection date			
	Details	**Y/N**	**Action required**	**Date Completed**	**Details**	**Y/N**	**Action required**	**Date Completed**
SUITABILITY OF CURRENT MAINTENANCE REGIME								
Continue as current Increase maintenance Decrease maintenance								
NEXT INSPECTION								
Proposed date for next inspection								

SPEL Puraceptor®

Class 1 Full Retention Separators

Overview

SPEL Puraceptor® oil separators treat 100% of the flow and have been designed and tested to meet the stringent British/European Standard BS EN 858-1. For peace of mind, install SPEL Puraceptors in high risk areas where the maximum hydrocarbon concentration in the outlet must not exceed 5mg/l.

All SPEL Puraceptors (Full Retention Separators) are fitted with a special automatic closure device (ACD) which shuts the separator down when the contained oil exceeds the maximum oil spill capacity.

The 'heart' of SPEL Separators is the unique long life, low maintenance coalescer unit which 'polishes' the final effluent after 90% of hydrocarbons and silt have been separated out.

Product Range

Series 200
(1.2m inside diameter):
NS 4 - NS 10
Catchment area: 222m² - 556m²

Series 300
(1.8m inside diameter):
NS 15 - NS 50
Catchment area: 833m² - 2,778m²

Series 400
(2.6m inside diameter):
NS 65 - NS 280
Catchment area: 3,611m² - 15,555m²

Series 500
(3.5m inside diameter):
NS 300 - NS 500
Catchment area: 16,665m² - 27,775m²

Series 600
(4m inside diameter):
NS 500 - NS 1,000
Catchment area: 27,775m² - 55,550m²

Note: NS 1,000 unit does not have silt capacity



Applications

Fuel storage/handling areas

Refuelling facilities

Vehicle maintenance yards

Heavy industrial areas

Distribution centres

Power/sub stations

Fire training grounds

Shell Design

Designed with reference to BS EN 13121. All tank shells carry the SPEL 25 Year Warranty and life expectancy in excess of 50 years.

Shell Specifications

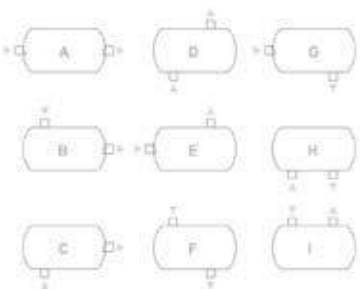
Different tank shell specifications are available dependent upon tank invert levels, ground conditions and ground water levels.

Inlet/Outlet Connections

160/225/300mm diameter PVCU socket/spigot.

450, 600, 750, 900 and 1200mm diameter GRP spigot available, for connecting to site pipework via Flex-Seal/Band-Seal or similar flexible couplings.

The nine inlet/outlet options below are available to assist with design and installation.

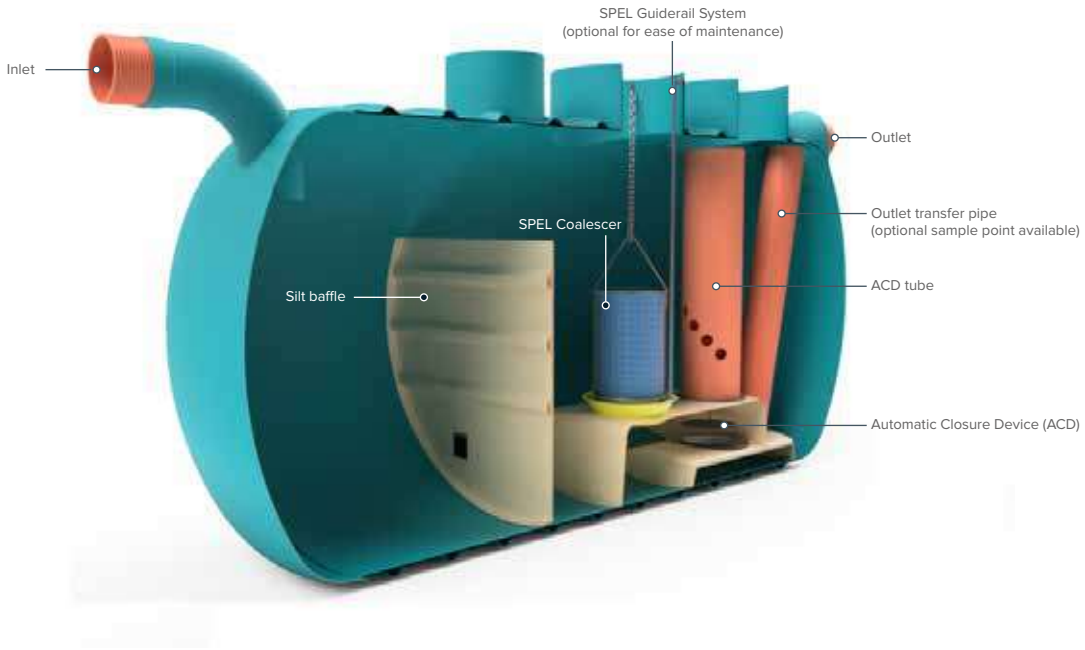


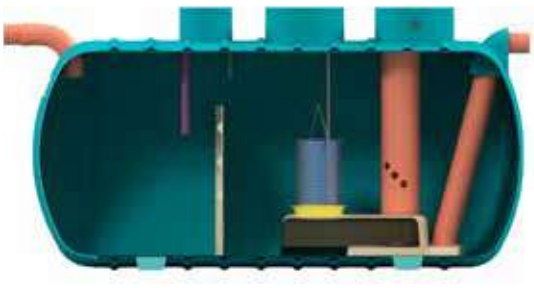
This graphic shows indicative locations only. For accurate location, please contact our technical team.

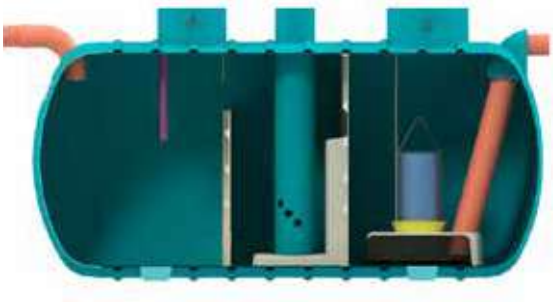
SPEL Puraceptor® Class 1 Single & Two Chamber Separators

Introduction

The SPEL Puraceptor® is a full retention model treating all the flow from the connected catchment area, it is available in two versions, single or two chamber, dependent upon the site application and requirements. See specification detail below. This system benefits from **BS EN 858 testing conducted by HR Wallingford** and the inclusion of the unique SPEL coalescer, ensuring the **highest performance and simple maintenance.**







Class 1 Single Chamber Separator

Operation:

Flow enters the chamber from the inlet pipe, and the separation process begins as the flow moves towards the coalescer. Oil rises to the surface, silt settles out and the cleanest water then enters the coalescer which polishes the flow to a higher level prior to discharge.

The SPEL Puraceptor® benefits from the unique SPEL coalescer which is the heart of all SPEL separation systems. The foam insert is located in a stainless steel basket and delivers high quality water, long life, and ease of maintenance.

The other key component is the fail safe Automatic Closure Device (ACD) which will shut the system down in the event of a catastrophic oil spill.

Class 1 Two Chamber Separator

Operation:

The SPEL Two Chamber Separator is the result of long development with National Grid and has resulted in a system that can substantially reduce maintenance costs.

The Two Chamber unit has all the benefits of the Class 1 Puraceptor® but the addition of a strategically located full height baffle wall protects the unique coalescer from the bulk of the silt load.

The coalescer is mounted in the second chamber (clean zone) where it is more effective as well as being protected. The result is that it will not clog as quickly and this can equate to longer periods between maintenance.

SPEL Automatic Closure Device (ACD)

Overview

The purpose of the Automatic Closure Device (ACD) is to close the separator off automatically when the maximum capacity of light liquid/oil is reached.

The ACD ensures that in the event of a major spillage, pollutants do not pass into the drainage system; it should not be regarded as a substitute for an automatic alarm/monitoring system. The oil alarm and ACD are both required to comply with BS EN 858.

If the tank should fill with light liquid/oil the ACD, which is calibrated for a specific gravity of 0.85, will automatically sink and close off the SPEL Puraceptor®.

Normally routine maintenance would include removing light liquid intercepted within the Puraceptor®. If a SPEL automatic alarm/monitoring system is incorporated, it will automatically indicate when the Puraceptor® should be emptied. Only in an emergency will the Puraceptor® fill to its maximum and activate the ACD.

In such an event the Puraceptor® should be completely sucked out/emptied and the ACD lifted out.

Prior to installation

Prior to installation the ACD retaining tube should be covered with polythene to prevent ingress of concrete etc., which would fall onto the ACD and cause a malfunction.

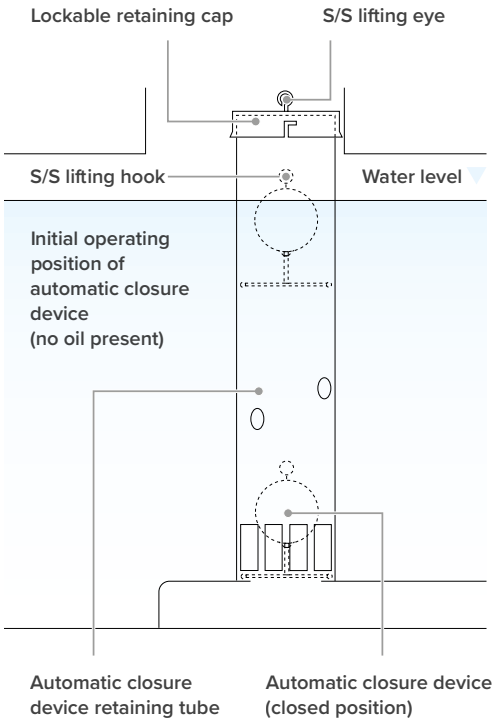
Maintenance

Dependent upon site conditions it is advisable to remove the ACD periodically taking care not to raise it too quickly and damage the plastic/copper float. Clean it from debris/silt to prevent premature closing. Check the seating in the base unit is free of debris/silt that could prevent proper closing in an emergency.

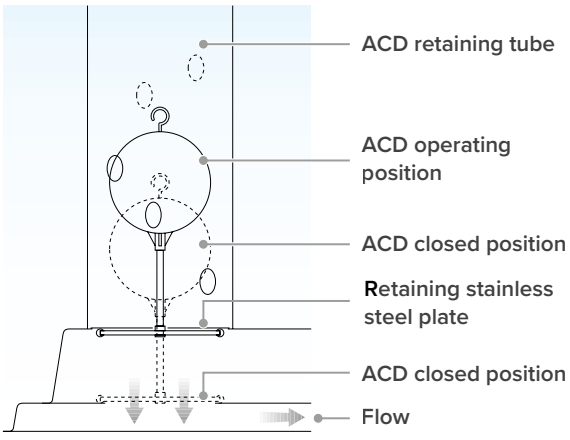
For Installation/Commissioning get in touch with our team: engineers@spelproducts.co.uk

'Companies who pollute the environment can be hit with unlimited financial penalties from the Environment Agency from today (11 December 2023).' *gov.uk, 'Unlimited penalties introduced for those who pollute environment' (11 December 2023)*

Automatic closure device **Type F** (Floating)
SPEL Puraceptor® class 1 separators
(two chamber) & full retention class 2 separators.



Automatic closure device **Type R** (Retained)
SPEL Puraceptor® class 1 separator
(single chamber).



SPEL Puraceptor® Class 1 Full Retention Separators

Single Chamber

Model	Series	Nominal Size (NS)	Catchment Area (m²)	Oil Storage (litres)	Silt Capacity (litres)	Overall Length* (mm)	Overall Diameter (mm)	Inlet Invert (mm)	Base to Inlet (mm)	Base to Outlet (mm)	Optimum In/Out Pipe Diameter** (mm)	Number of Access Shafts (dia. mm)				
		Flow (l/s)				L		A	B	C		450	600	750	900	1200
P004 1C/SC	200	4	222	40	400	1,720	1,225	630	1,110	1,050	160	-	-	1	-	-
P006 1C/SC	200	6	333	60	600	2,310	1,225	630	1,110	1,050	160	-	-	1	-	-
P010 1C/SC	200	10	556	100	1,000	3,410	1,225	630	1,110	1,050	160	-	-	1	-	-
P015 1C/SC	300	15	833	150	1,500	3,200	1,875	350	1,800	1,740	225	1	-	1	-	-
P020 1C/SC	300	20	1,111	200	2,000	3,540	1,875	350	1,800	1,740	225	-	1	1	-	-
FP 1C/SC	300	20	1,111	200	2,000	4,290	1,875	350	1,800	1,740	225	-	-	1	-	-
P030 1C/SC	300	30	1,667	300	3,000	4,420	1,875	390	1,760	1,700	300	-	1	-	1	-
P040 1C/SC	300	40	2,222	400	4,000	5,760	1,875	390	1,760	1,700	300	-	1	-	1	-
P050 1C/SC	300	50	2,778	500	5,000	7,060	1,875	390	1,760	1,700	300	-	1	-	1	-
P065 1C/SC	400	65	3,611	650	6,500	4,860	2,700	425	2,625	2,525	300	-	1	-	2	-
P080 1C/SC	400	80	4,444	800	8,000	5,700	2,700	425	2,625	2,525	300	-	1	-	2	-
P100 1C/SC	400	100	5,555	1,000	10,000	7,400	2,700	475	2,575	2,475	450	-	1	-	2	-
P125 1C/SC	400	125	6,944	1,250	12,500	8,580	2,700	475	2,575	2,475	450	-	-	1	2	-
P150 1C/SC	400	150	8,333	1,500	15,000	10,180	2,700	475	2,575	2,475	450	-	-	1	2	-
P165 1C/SC	400	165	9,166	1,650	16,500	11,200	2,700	500	2,550	2,450	450	-	2	1	1	-
P200 1C/SC	400	200	11,110	2,000	20,000	13,710	2,700	660	2,390	2,290	600	-	2	1	1	-
P250 1C/SC	400	250	13,888	2,500	25,000	16,750	2,700	660	2,390	2,290	600	-	2	1	2	-
P280 1C/SC	400	280	15,555	2,800	28,000	18,800	2,700	660	2,390	2,290	600	-	1	2	2	-
P300 1C/SC	500	300	16,665	3,000	30,000	12,410	3,650	805	3,070	2,970	750	-	1	2	2	-
P400 1C/SC	500	400	22,220	4,000	40,000	15,760	3,650	805	3,070	2,970	750	-	2	2	2	-
P500 1C/SC	500	500	27,775	5,000	50,000	20,530	3,650	955	2,920	2,820	900	-	2	2	1	1
P500 1C/SC	600	500	27,775	5,000	50,000	16,040	4,150	925	3,250	3,150	900	-	2	2	1	1
P600 1C/SC	600	600	33,330	6,000	60,000	19,080	4,150	925	3,250	3,150	900	-	2	2	-	2
P700 1C/SC	600	700	38,888	7,000	70,000	21,460	4,150	925	3,250	3,150	900	-	3	2	3	-
P800 1C/SC	600	800	44,440	8,000	80,000	23,020	4,150	925	3,250	3,150	900	-	3	2	2	1
P900 1C/SC	600	900	49,846	9,000	90,000	24,658	4,150	925	3,250	3,150	900	-	3	2	-	3

All of the above models are available without silt capacity, below are selected models for size comparison.
The P1000 model is only available in non silt format.

P050 1C	300	50	2,778	500	-	5,070	1875	390	1,760	1,700	300	-	-	-	1	-
P065 1C	400	65	3,611	650	-	3,710	2,700	425	2,625	2,525	300	-		-	2	-
P100 1C	400	100	5,555	1,000	-	5,250	2,700	475	2,575	2,475	450	-		-	2	-
P125 1C	400	125	6,944	1,250	-	6,090	2,700	475	2,575	2,475	450	-	-	-	2	-
P165 1C	400	165	9,166	1,650	-	7,960	2,700	500	2,550	2,450	450	-	2		1	-
P250 1C	400	250	13,888	2,500	-	11,830	2,700	660	2,390	2,290	600	-	2		2	-
P300 1C	400	300	16,665	3,000	-	14,120	2,700	660	2,390	2,290	600	-	2		2	-
P500 1C	500	500	27,775	5,000	-	14,340	3,650	955	2,920	2,820	900	-	2	2	1	1
P500 1C	600	500	27,775	5,000	-	11,470	4,150	925	3,250	3,150	900	-	2	2	1	1
P700 1C	600	700	38,888	7,000	-	15,880	4,150	925	3,250	3,150	900	-	3	2	3	-
P1000 1C	600	1,000	55,550	10,000	-	21,407	4,150	925	3,250	3,150	900	-	3	2	1	3

**Overall length subject to inlet/outlet and orientation.*

***SPEL Separators are designed for a maximum flow (NS/NSB) but can be fitted with larger than the recommended maximum connection size IN/OUT or with the addition of adapters providing the maximum flow (NS/NSB) cannot be exceeded or any increase in the operating level in the SPEL Separator to cause the captured pollutants to escape into the vent connections or through access shaft connections. Any overriding of the above criteria could jeopardise performance to the European Standard BS EN 858-1.*

Note: Model FP1C/SC is a special Forecourt separator with 7600 litre spillage holding capacity. See Forecourt separator detail on Page 3.14

SPEL Puraceptor® Class 1 Full Retention Separators

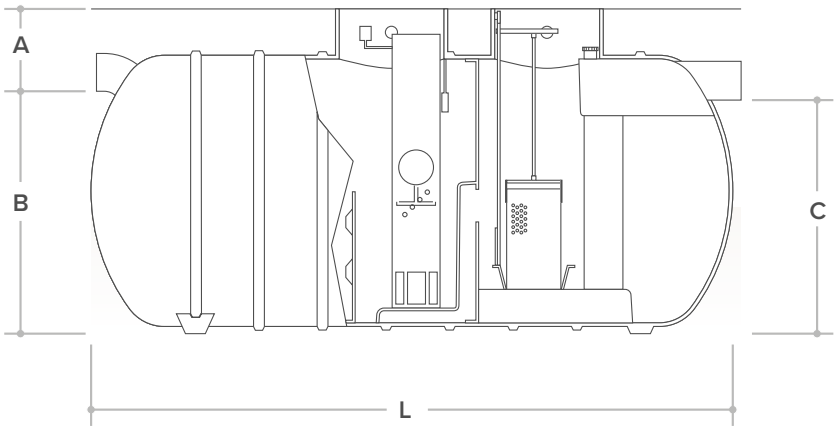
Two Chamber

Model	Series	Nominal Size (NS)	Catchment area (m²)	Oil storage (litres)	Silt capacity (litres)	Overall length* (mm)	Overall diameter (mm)	Inlet Invert (mm)	Base to inlet (mm)	Base to outlet (mm)	Optimum in/out pipe diameter** (mm)	Number of access shafts (dia. mm)				
		Flow (l/s)				L		A	B	C		450	600	750	900	1200
P006 2C/SC	200	6	333	60	600	3,050	1,225	340	1,200	1,140	160	-	1	1	-	-
P010 2C/SC	200	10	556	100	1,000	4,690	1,225	340	1,200	1,140	160	-	1	1	-	-
P015 2C/SC	300	15	833	150	1,500	4,015	1,875	350	1,800	1,740	225	-	-	2	-	-
P020 2C/SC	300	20	1,111	200	2,000	4,015	1,875	350	1,800	1,740	225	-	-	2	-	-
FP 2C/SC***	300	20	1,111	200	2,000	5,500	1,875	350	1,800	1,740	225	-	-	2	-	-
P025 2C/SC	300	25	1,389	250	2,500	4,290	1,875	350	1,800	1,740	225	-	-	2	-	-
P030 2C/SC	300	30	1,667	300	3,000	4,420	1,875	390	1,760	1,700	300	-	1	2	-	-
P035 2C/SC	300	35	1,944	350	3,500	5,070	1,875	390	1,760	1,700	300	-	1	2	-	-
P040 2C/SC	300	40	2,222	400	4,000	5,760	1,875	390	1,760	1,700	300	-	1	2	-	-
P050 2C/SC	300	50	2,778	500	5,000	7,060	1,875	390	1,760	1,700	300	-	1	2	-	-
P065 2C/SC	300	65	3,611	650	6,500	9,180	1,875	390	1,760	1,700	300	1	-	2	-	-
P080 2C/SC	400	80	4,444	800	8,000	5,700	2,700	425	2,625	2,525	300	-	-	1	1	-
P100 2C/SC	400	100	5,555	1,000	10,000	7,400	2,700	475	2,575	2,475	450	-	-	1	1	-
P125 2C/SC	400	125	6,944	1,250	12,500	8,580	2,700	475	2,575	2,475	450	-	-	2	1	-
P150 2C/SC	400	150	8,333	1,500	15,000	10,180	2,700	500	2,550	2,450	450	-	-	2	1	-
P200 2C/SC	400	200	11,110	2,000	20,000	13,710	2,700	660	2,390	2,290	600	-	1	2	1	-
P250 2C/SC	400	250	13,888	2,500	25,000	16,752	2,700	660	2,390	2,290	600	-	2	1	2	-
P300 2C/SC	500	300	16,665	3,000	30,000	12,530	3,650	675	3,200	3,100	600	-	1	2	-	1
P400 2C/SC	500	400	22,220	4,000	40,000	15,980	3,650	675	3,200	3,100	600	-	2	2	2	-
P500 2C/SC	500	500	27,775	5,000	50,000	20,530	3,650	955	2,920	2,820	900	-	2	2	1	1
P500 2C/SC	600	500	27,775	5,000	50,000	16,260	4,150	925	3,250	3,150	900	-	2	1	1	1
P600 2C/SC	600	600	33,330	6,000	60,000	19,080	4,150	925	3,250	3,150	900	-	2	2	3	-
P700 2C/SC	600	700	38,888	7,000	70,000	22,270	4,150	925	3,250	3,150	900	-	3	2	3	-
P800 2C/SC	600	800	44,440	8,000	80,000	23,020	4,150	925	3,250	3,150	900	-	3	2	2	1
P900 2C/SC	600	900	50,000	9,000	90,000	24,658	4,150	925	3,250	3,150	900	-	3	2	1	2

*Overall length subject to inlet/outlet and orientation.

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***Note: Model FP2C/SC is a special Forecourt separator with 7600 litre spillage holding capacity. See Forecourt separator detail on Page 3.14



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