Project Name: Nuneham Solar Farm

Project number: P21-2947

Report Name: Flood Risk and Drainage Technical Note

Author: Natalie Morgan

Checked by: Tom Graham

Approved by: Tom Graham

Date: 22/01/2026

1. Introduction

1.1. This Flood Risk and Drainage Technical Note has been prepared on behalf of RES to accompany the planning submission documents for a proposed solar farm.

1.2. A Flood Risk Assessment and Surface Water Drainage Strategy (report reference R001v3-IN_P21-2947) was prepared by Pegasus Group and submitted as part of the planning application (South Oxfordshire District Council application reference P24/S1336/FUL) in April 2024.

1.3. Following the submission of the planning application, the proposed substation has been relocated owing to archaeological constraints within the previous location. As such, the surface water drainage strategy has been revised to suit the amended site layout.

1.4. Furthermore, the national flood risk datasets have been updated since the submission of the planning application. This Technical Note also reviews the current Environment Agency (EA) mapping against the amended site layout.

2. Surface Water Drainage Strategy

2.1. The updated surface water drainage strategy maintains the principles of the submitted drainage strategy, to which the South Oxfordshire and Vale of White Horse District Council drainage team and Oxfordshire County Council as the Lead Local Flood Authority had no objections.

2.2. Flows generated by the substation compound would be attenuated using a cellular storage tank before being discharged to the watercourse to the west, as previously proposed. The location of the outfall has been moved further south to facilitate a gravity connection from the substation compound to the watercourse. The revised cellular storage design has been coordinated to align with the latest layout, substation infrastructure requirements, and the proposed landscaping.

2.3. The swales along the western site boundary have been maintained in line with previous South Oxfordshire and Vale of White Horse District Council comments. One small section of swale has been removed to enable the outfall connection.

2.4. The updated surface water drainage strategy is presented in **Appendix A** and the associated calculations are provided in **Appendix B**.

3. Review of Flood Risk

Fluvial Flooding

3.1. The EA Flood Map for Planning was last updated in November 2025. **Figure 3.1** shows the revised substation compound is located within Flood Zone 1 for the present day, as well as in line with future climate change projections.

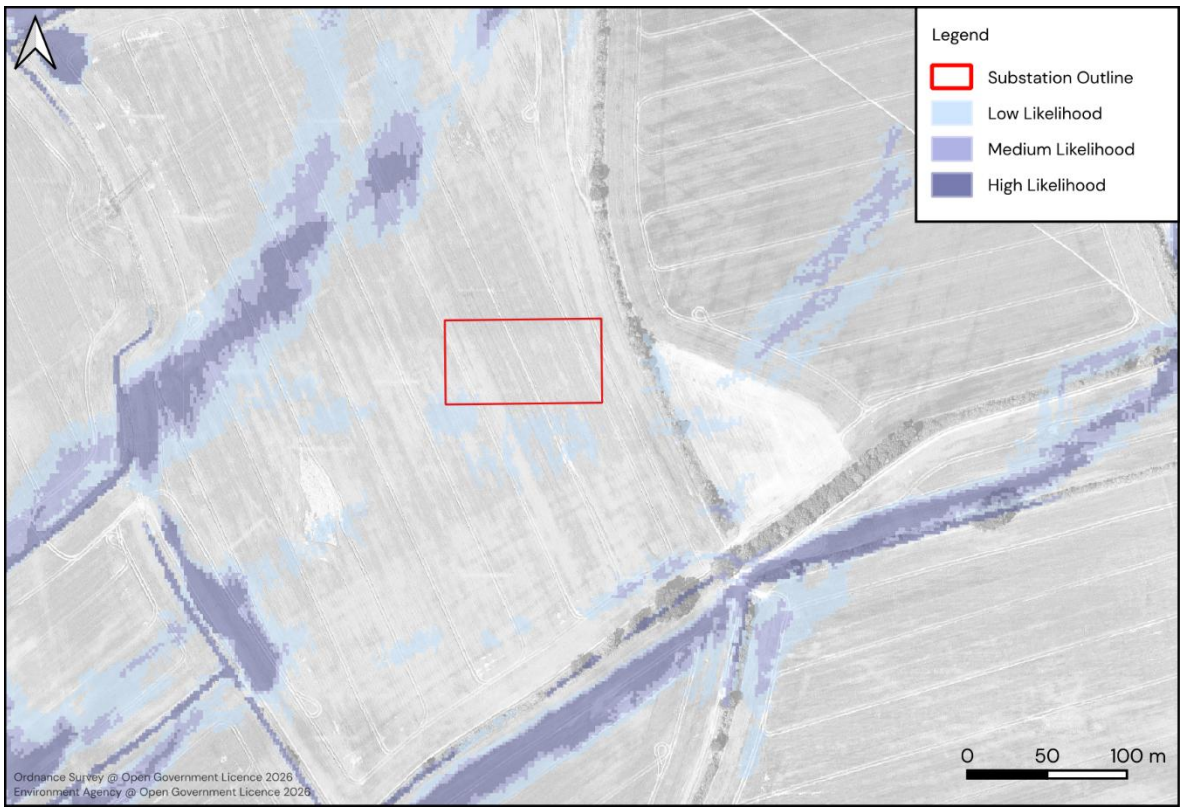
Figure 3.1 – Flood Map for Planning

Surface Water Flooding

3.2. The EA Risk of Flooding from Surface Water (RoFSW) dataset was last updated in September 2025. **Figure 3.2** shows the vast majority of the substation compound is located in an area with a very low yearly chance of surface water flooding. A very small area in the south-west of the substation compound extents is located in an area with a low yearly chance of surface water flooding, taking into account future climate change projections. The RoFSW indicates this flood risk is shallow, with depths of less than 0.2 metres.

3.3. This area of risk is isolated and does not form part of a wider overland flow route, and it is anticipated to be a result of ponding at a localised topographical low point on site. This minor flood risk would be mitigated through the profiling of site levels during the detailed design stage.

Figure 3.2 – Risk of Flooding from Surface Water

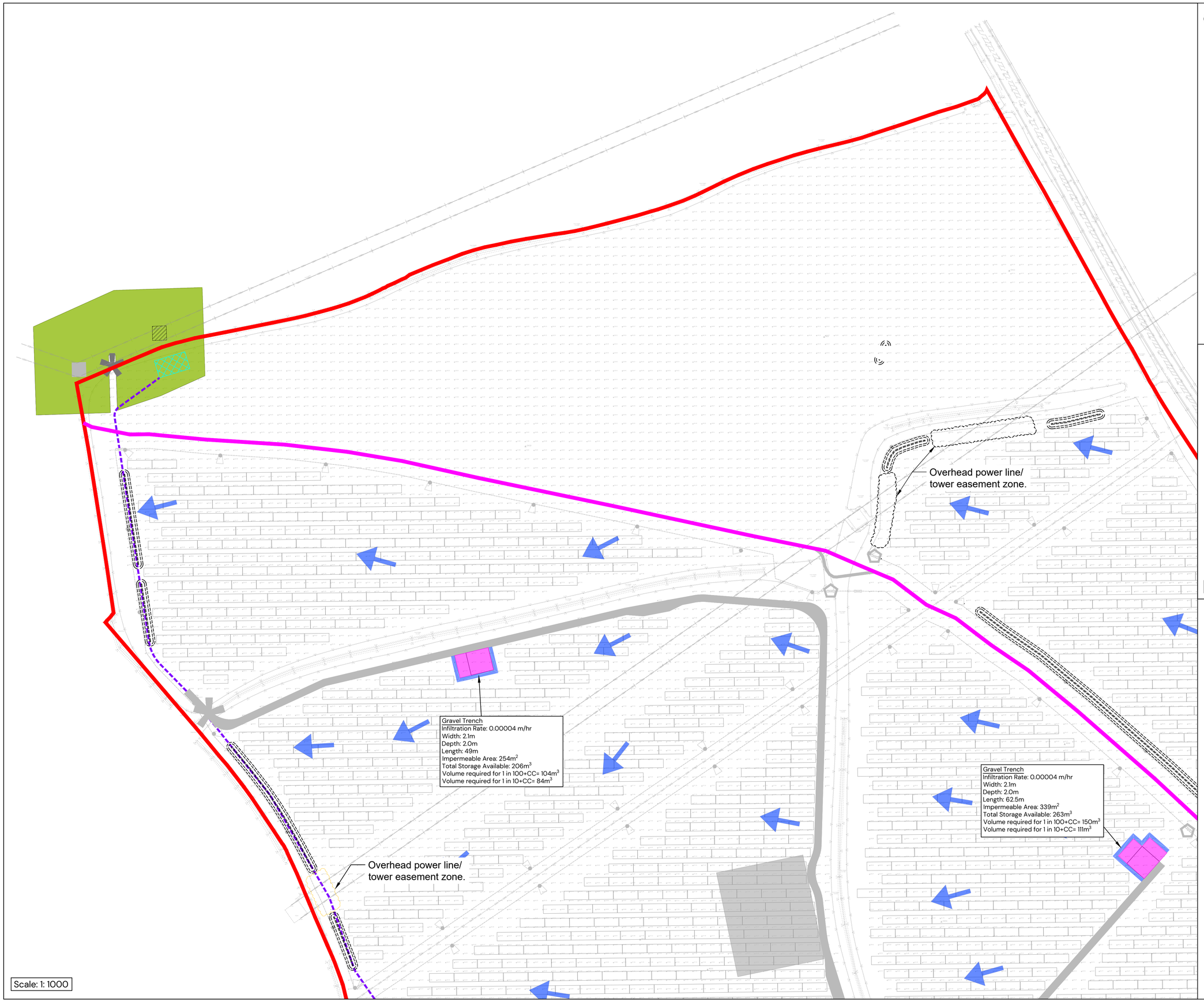


4. Summary

4.1. Following the relocation of the proposed substation compound, the surface water drainage strategy has been updated in accordance with the latest site layout. The principles of the previous submitted strategy have been maintained through the inclusion of a cellular storage tank.

4.2. The EA fluvial and pluvial datasets have been updated since the submission of the FRA and Surface Water Drainage Strategy. The substation compound is not considered to be at risk of flooding.

Appendix A – Surface Water Drainage Strategy



Scale: 1: 1000

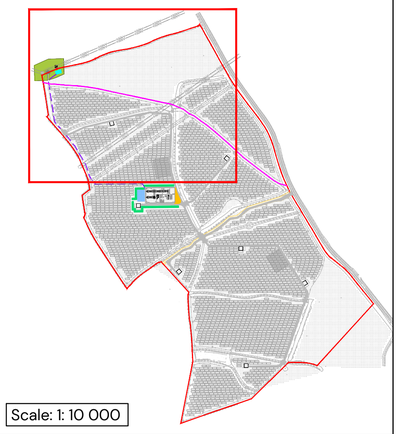
N

Key:

- Proposed Access Track
- Proposed Additional Swales
- Overland Flow Path

Notes:

1. This drawing has been provided for information purposes, not to be used for construction or costing.
2. Do not use this drawing to scale from.
3. Pegasus group take no responsibility for the misuse of this drawing.
4. Swales have been designed to be 0.5 wide x 0.5m deep with a 1:3 embankment plus an additional 1m provisional allowance for earthworks.
5. A site specific topographical survey was undertaken by Landmark Surveys Wales (Dated : September 2022; drawing reference :6387)
6. The site layout was produced by RES (Dated : N/A ; drawing reference 04531-RES-LAY-DR-PT-003)
7. Reference to be made to Figure 6 Typical Access Track Detail (Drawing No. 04531-RES-ERW-DR-PT-001) for access track/drainage swale interface.
8. The proposed interception swales are not fixed and will be subject to detailed design.



Scale: 1: 10 000

REV	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
P7	22/01/2026	Updated in accordance with client comments	KC	NM	TG
P6	08/01/2026	Updated to suit Site Layout	SOM	NM	TG
P5	07/11/2025	Updated to suit Site Layout, Swales added to plan	SOM	NM	TG
P4	19/08/2024	Updated in accordance with LLFA comments	AJM	LG	LAJ
P3	21/03/2024	Updated Site Layout	LG	LAJ	LAJ
P2	12/02/2024	Updated Site Layout	LG	LAJ	LAJ
P1	21/12/2023	First Issue	MR	LG	LAJ

Drainage Strategy Drawing Sheet 1

Land West of A4074,
South Oxfordshire

CLIENT:
RES Ltd

DATE: 21/12/23
SCALE: As Noted
DRAWN BY: MR
CHECKED BY: LG
APPROVED BY: LAJ

DRAWING NUMBER: P21-2947 - PEG - XX - XX - DR - C - 0100 - P7
PG OFFICE / TEAM: BRS/IN

PEGASUS REF No: P21-2947
DRAWING STATUS: SO

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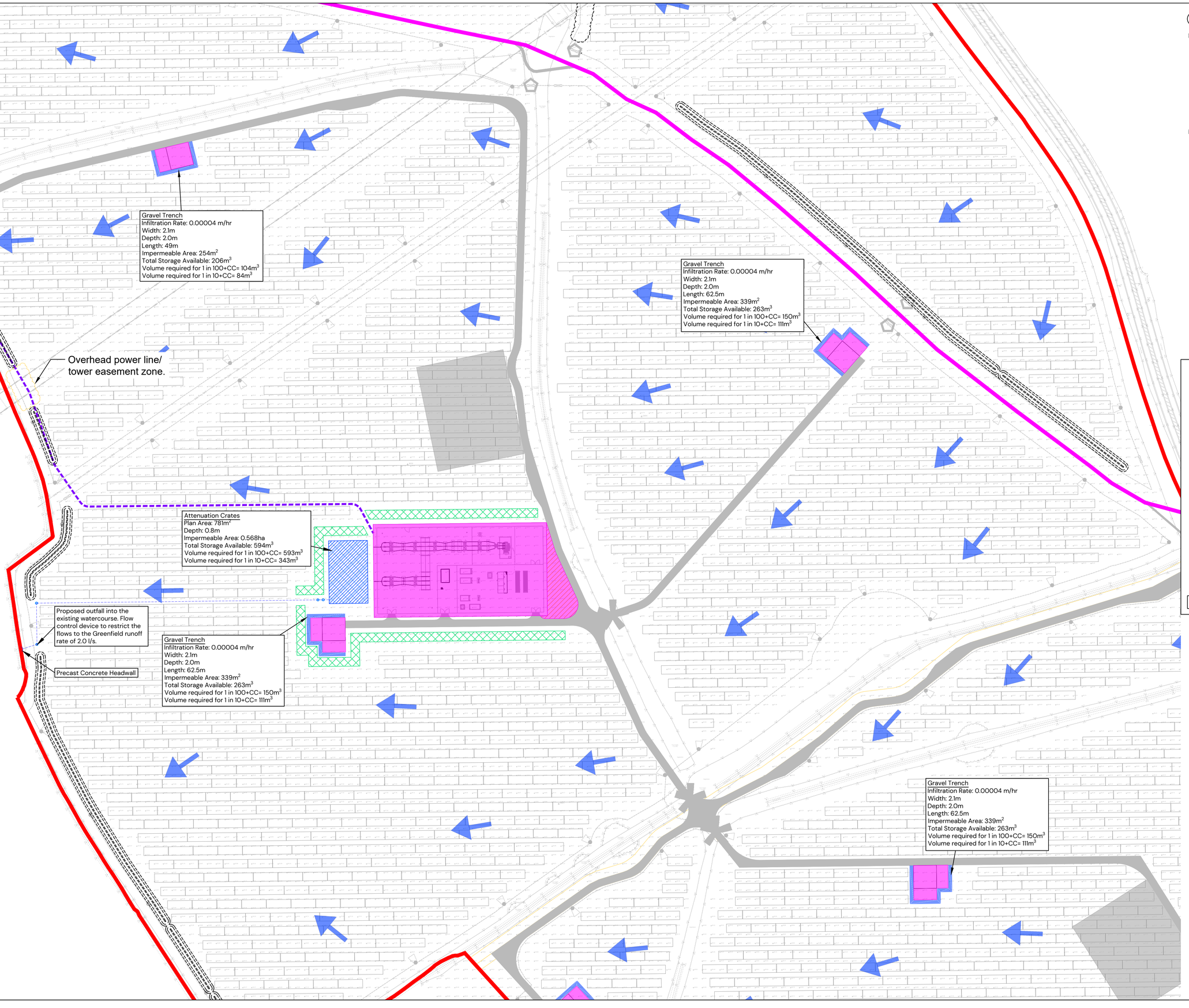

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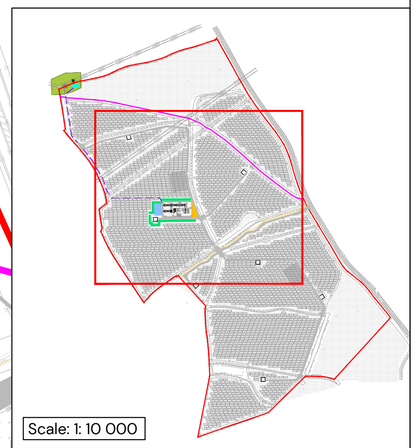

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Drainage Strategy Drawing Sheet 2

Land West of A4074, South Oxfordshire

CLIENT:
RES Ltd

DATE: 21/12/2023
SCALE: As Noted
DRAWN BY: MR
CHECKED BY: LG
APPROVED BY: LAJ

DRAWING NUMBER: P21-2947 - PEG - XX - XX - DR - C - 0101 - P7
PG OFFICE / TEAM: BRS/IN

PEGASUS REF No: P21-2947
DRAWING STATUS: SO

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Gravel Trench
Infiltration Rate: 0.00004 m/hr
Width: 2.1m
Depth: 2.0m
Length: 49m
Impermeable Area: 254m^2
Total Storage Available: 206m^3
Volume required for 1 in 100+CC= 104m^3
Volume required for 1 in 10+CC= 84m^3

Gravel Trench
Infiltration Rate: 0.00004 m/hr
Width: 2.1m
Depth: 2.0m
Length: 62.5m
Impermeable Area: 339m^2
Total Storage Available: 263m^3
Volume required for 1 in 100+CC= 150m^3
Volume required for 1 in 10+CC= 111m^3

Gravel Trench
Infiltration Rate: 0.00004 m/hr
Width: 2.1m
Depth: 2.0m
Length: 49m
Impermeable Area: 254m^2
Total Storage Available: 206m^3
Volume required for 1 in 100+CC= 104m^3
Volume required for 1 in 10+CC= 84m^3

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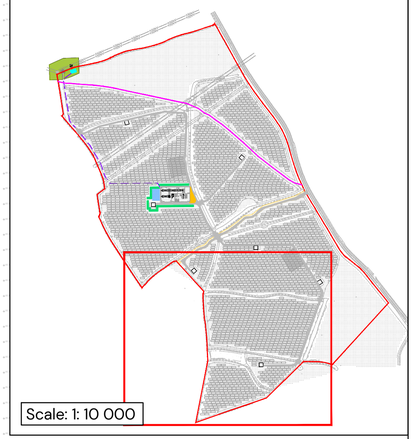

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Drainage Strategy Drawing Sheet 3

Land West of A4074,
South Oxfordshire

CLIENT:
RES Ltd

DATE: 21/12/2023
SCALE: As Noted
DRAWN BY: MR
CHECKED BY: LG
APPROVED BY: LAJ

DRAWING NUMBER: P21-2947 - PEG - XX - XX - DR - C - 0102 - P7
PG OFFICE / TEAM: BRS/IN

PEGASUS REF No: P21-2947
DRAWING STATUS: SO

PEGASUS GROUP

Appendix B – Drainage Calculations

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
Storage	0.568	5.00	57.550	1200	454148.070	200084.153	1.800
Outfall	0.000		55.400	1200	453964.681	200011.657	0.600

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	Storage	Outfall	197.198	0.600	55.750	54.800	0.950	207.6	375	7.62	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.254	138.4	102.6	1.425	0.225	0.568	0.0	241	1.368

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	197.198	207.6	375	Circular	57.550	55.750	1.425	55.400	54.800	0.225

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	Storage	1200	Manhole	Adoptable	Outfall	1200	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	1440	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Node Storage Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	55.750	Product Number	CTL-SHE-0070-2000-0800-2000
Design Depth (m)	0.800	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node Storage Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	55.750
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	785.0	0.0	0.800	785.0	0.0	0.801	0.0	0.0

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	Storage	945	56.544	0.794	29.8	593.2582	0.0000	SURCHARGED
15 minute summer	Outfall	1	54.800	0.000	2.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Discharge Vol (m³)
960 minute winter	Storage	Hydro-Brake®	Outfall	2.0	250.9