PLANNING APPLICATION FOR A RENEWABLE ENERGY SCHEME COMPRISING GROUND MOUNTED PHOTOVOLTAICS

FLOOD RISK ASSESSMENT

LAND AT PELHAM SPRING (MAGGOTS END), BISHOP'S STORTFORD, UTTLESFORD

ON BEHALF OF LOW CARBON SOLAR PARK 6 LIMITED

Pegasus Group

Birmingham | Bracknell | Bristol | Cambridge | Cirencester | Dublin | East Midlands | Leeds | Liverpool | London | Manchester | Newcastle | Peterborough

DESIGN ENVIRONMENT PLANNING ECONOMICS HERITAGE

Pegasus Group is a trading name of Pegasus Planning Group Limited (07277000) registered in England and Wales
Registered Office: Pegasus House, Querns Business Centre, Whitworth Road, Cirencester, Gloucestershire, GL7 1RT

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APPENDICES

1. INTRODUCTION

Background

1.1 Pegasus Planning Group Ltd has been appointed by Low Carbon Solar Park 6 Limited (herein referred to as "the Applicant") to undertake a Flood Risk Assessment (FRA) for a proposed solar energy scheme at land at Maggots End, Bishop's Stortford, Uttlesford.

1.2 This assessment considers the risks of all types of flooding to the site including tidal, fluvial, surface, historic, groundwater, sewer and artificial sources. It also includes a drainage strategy to manage surface water runoff, no foul water will be produced by the development.

National and Local Policies

1.3 The National Planning Policy Framework (NPPF) states that a site-specific Flood Risk Assessment will be required for proposals:

a) that are greater than 1 hectare in area within Flood Zone 1;

b) for all proposals for new development (including minor development and change of use) in Flood Zones 2 and 3;

c) in an area within Flood Zone 1 which has critical drainage problems; and where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding.

d) in an area within Flood Zone 1 identified in a Strategic Flood Risk Assessment as being at increased flood risk in the future.

e) in an area in Flood Zone 1 that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

1.4 The site is located within Flood Zone 1 and is larger than 1ha. therefore, it requires an FRA in accordance with NPPF.

1.5 As of April 2015, the legislation for dealing with FRAs changed, with additional emphasis put on the use of Sustainable Drainage Systems (SuDS) within drainage schemes for new developments.

1.6 In February 2016, the Environment Agency (EA) introduced new guidance relating to climate change allowance, which has increased the percentage rate of change applied to the 1 in 100 year event scenario.

1.7 As such, any new application will require a surface water drainage scheme submitted to accompany all planning applications and will be required to demonstrate the use of SuDS within the design and should be in line with the requirements as set out within the National Planning Policy Framework Technical Guidance (NPPFTG).

1.8 The following report has been based on information and requirements derived from NPPF, NPPFTG, the British Geological Survey (BGS), the EA planning maps.

1.9 This assessment has also reviewed the requirements of the Uttlesford District Council Level 1 Strategic Flood Risk Assessment (SFRA) dated May 2016.

Strategic Flood Risk Assessment

1.10 JBA Consulting undertook a Level 1 Strategic Flood Risk Assessment (SFRA) in May 2016 on behalf of Uttlesford District Council. This SFRA was produced as an update to an existing out-dated SFRA from March 2008.

1.11 This report is used to inform any site within the catchment area that requires a site-specific FRA.

1.12 The main purpose of the SFRA is:

The Planning Practice Guidance advocates a tiered approach to risk assessment and identifies the following two levels of SFRA

Level 1: where flooding is not a major issue and where development pressures are low. The assessment should be sufficiently detailed to allow application of the Sequential Test.

Level 2: where land outside Flood Zone 2 and 3 cannot appropriately accommodate all the necessary development creating the need to apply the NPPF's Exception Test. In these circumstances the assessment should consider the detailed nature of the food characteristics within a Flood Zone.

This updated SFRA is a Level 1 SRFA with the aim of providing guidance to planning and developers on flood risk and to enable the application of the Sequential Test.

In preparing its Local Plan, the Council is considering a number of Areas of Search. These consist of nine new settlement Areas of Search, three urban extension Areas of Search (Saffron Walden, Great Dunmow, Bishop's Stortford), and Areas of Search covering the key villages. They are also considering Areas of Search for each of the smaller 'Type A' villages (villages with primary schools).

1.13 The key objectives of the 2016 SFRA are:

- Critically review and update the 2008 SFRA, taking into account the latest flood risk information and any updates to legislation and policy;

- Provide an individual flood risk analysis of the Areas of Search identified within the district as part of the Local Plan preparation;

- Provide mapping showing the Flood Zones for planning and flood risk from other sources in accordance with the provision of national flood risk guidance.

2. EXISTING SITE AND HYDROLOGY

Site Location & Existing Conditions

2.1 The site area is approximately 76.39 Ha in overall size and is entirely greenfield.

2.2 The site consists of various agricultural fields and is accessed from an existing carriageway to the south of the site which links East End to Maggots End.

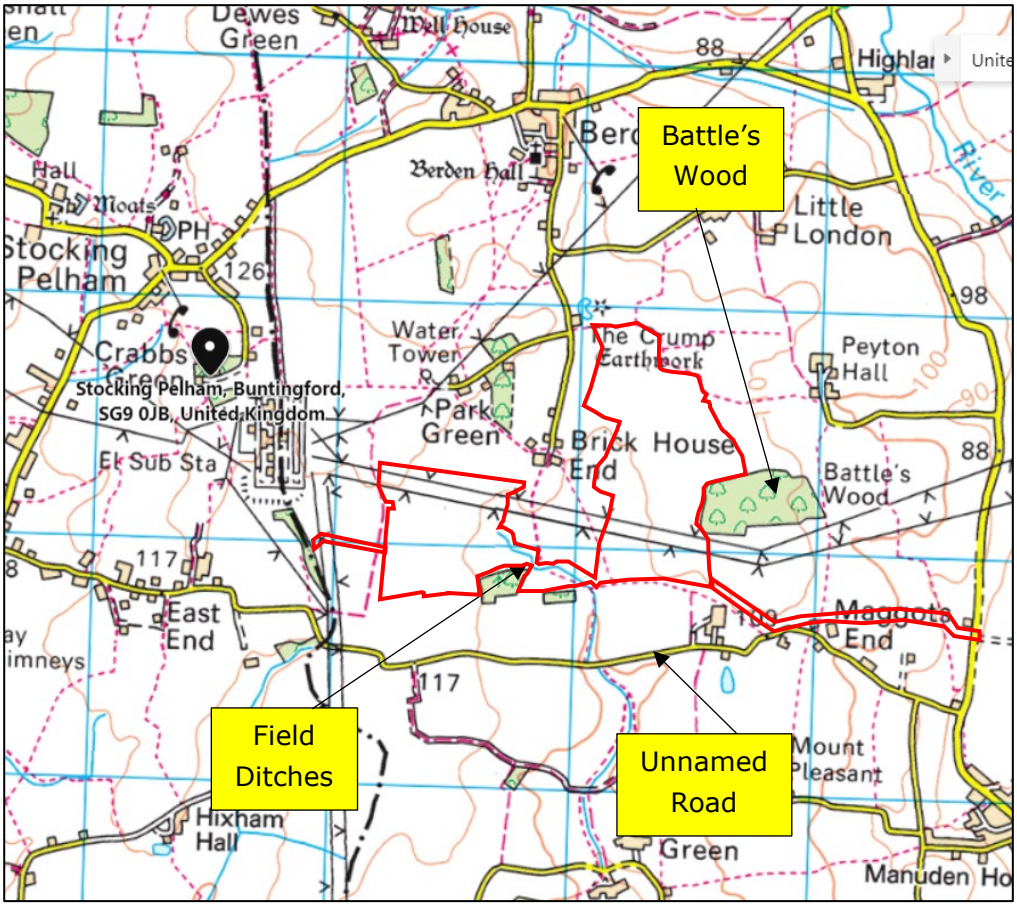
2.3 The site has existing various field ditches running within the southern part of the site.

2.4 Approximate site co-ordinates are E: 547095; N: 227872, with the nearest post code CM23 1AZ. The site is located off an unnamed road running through Maggots End, Bishop's Stortford, Uttlesford.

2.5 The Environment Agency flood map shows the entire site as lying entirely within Flood Zone 1 (<1:1000 year probability of flooding).

2.6 A copy of the EA flood map can be found at Section 5 of this report.

Figure 2.1 – Site Location



2.7 A topographical survey has been produced by Anthony Brookes Surveys Ltd (dated March 2021) it shows the site as typically falling from north to south and generally in the direction of the existing field ditches throughout the site. A copy of the topographical survey can be found in **Appendix A**.

Existing Drainage and Hydrology

2.8 A few existing field ditches lie within the southern part of the site and flow in a southerly direction and are assumed to flow into the Bourne Brook further south past the site boundary.

2.9 There are no known existing sewer system networks within the vicinity of the site, however, public sewer records have not been requested at this stage.

2.10 Geological data held by the British Geological Survey (BGS) indicates that the bedrock geology underlying the site is "Lewes Nodular Chalk Formation and Seaford Chalk Formation (undifferentiated) - Chalk"

2.11 The Soilscape soils data shows the site as both "Lime-rich loamy and clayey soils with impeded drainage – slightly impeded drainage"

3. PROPOSED DEVELOPMENT

3.1 It is proposed to develop the site to consist of the construction, operation, maintenance and decommissioning of a ground mounted solar park. Further details of the proposal and the technology used are provided separately as part of the planning application.

3.2 The development will consist of mounted solar panel modules, substations, battery stations, access roads and a transformer compound.

3.3 The existing site area is entirely 'greenfield' development with areas of trees and vegetation along the perimeter boundaries, therefore the majority of the site is considered to be permeable. The nature of the proposals consists of mainly solar panel modules which are raised off the ground, therefore not creating any impermeable areas. The only areas of impermeable nature will be the new access roads, substation/power station units and transformer compound.

3.4 The site is to be accessed from an existing carriageway to the south of the development that links East End to Maggots End.

3.5 A copy of the proposed site layout can be found at **Appendix B**.

4. DEVELOPMENT VULNERABILITY AND FLOOD ZONE CLASSIFICATION

National Planning Policy Framework (NPPF)

4.1 Local Planning Authorities, (LPA) have a statutory obligation to consult the Environment Agency, (EA) on all applications in flood risk zones. The EA will consider the effects of flood risk in accordance with the NPPF.

4.2 NPPF requires that, as part of the planning process:

- A 'site specific' Flood Risk Assessment will be undertaken for any site that has a flood risk potential.
- Flood risk potential is minimised by applying a 'sequential approach' to locating 'vulnerable' land uses.
- Sustainable drainage systems are used for surface water disposal where practical.
- Flood risk is managed through the use of flood resilient and resistant techniques.
- Residual risk is identified and safely managed.

4.3 Table 1 of NPPF, categorises flood zones into:

- Zone 1- Low probability (< 1 in 1000 years)
- Zone 2- Medium probability (1 in 1000 - 1 in 100 years)
- Zone 3a- High probability (> 1 in 100 years)
- Zone 3b- The functional floodplain (>1 in 20 years)

4.4 The NPPF sets out a matrix indicating the types of development that are acceptable in different Flood Zones (see Table 4.1). The proposed development is a solar farm and is located entirely in Flood Zone 1 and therefore, development in this area is considered appropriate.

4.5 NPPF also categorises types of development into Flood Risk Vulnerability groups (FRVG). NPPF does not specifically categorise solar farms into a FRVG, however, given the type of development and that no personnel are present at the site it is fair to conclude that the development can be classified as 'less vulnerable'.

Table 4.1 – NPPF Guidance

Flood Zones	Flood Risk Vulnerability Classification				
	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test Required	✓	✓	✓
Zone 3a	Exception Test Required	✗	Exception Test Required	Exception Test Required	✓
Zone 3b	Exception Test Required	✗	✗	✗	✓

Sequential test

4.6 The development lies within Flood Zone 1 therefore the sequential test is deemed to have been passed.

Exception Test

4.7 In accordance with the NPPF guidance the exception test is not required.

5. SITE SPECIFIC FLOODING ISSUES AND EXISTING FLOOD RECORDS

5.1 Local Planning Authorities, (LPA) have a statutory obligation to consult the Environment Agency, (EA) on all applications in flood risk zones. The EA will consider the effects of flood risk in accordance with the NPPF.

National Planning Policy Framework (NPPF)

5.2 In accordance with the National Planning Policy Framework, this Flood Risk Assessment considers all sources of flooding including:

a) Tidal Flooding – from sea;
b) Fluvial Flooding – from rivers and streams;
c) Pluvial Flooding – overland surface water flow and exceedance;
d) Historic flooding – known historic flooding issues;
e) Groundwater flooding – from elevated groundwater levels or springs;
f) Flooding from sewers – exceedance flows from existing sewer systems; and
g) Artificial sources – reservoirs, canals etc.

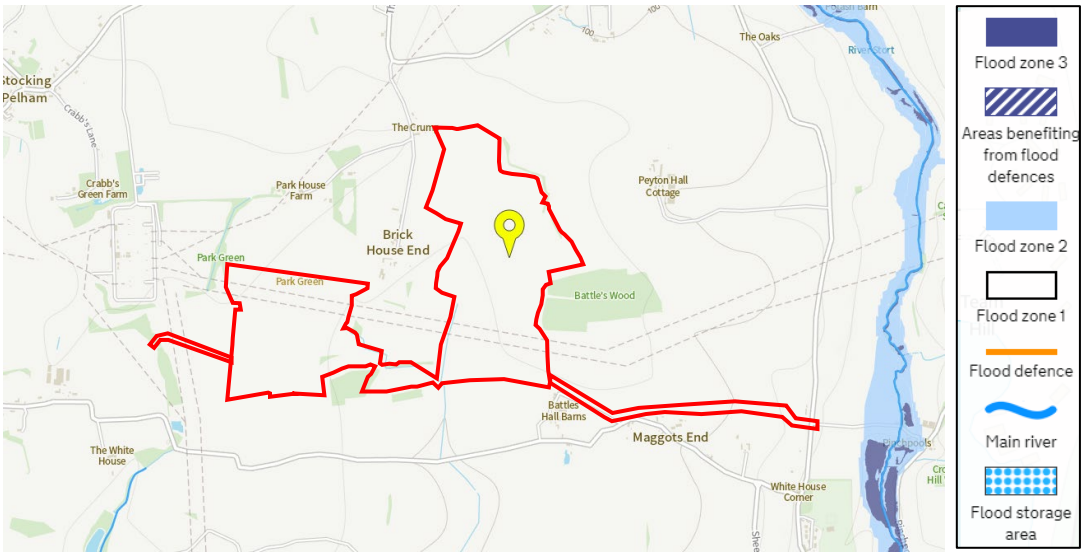
Tidal Flooding

5.3 The Environment Agency website provides basic flood mapping data as a general guide to whether a site is at risk of flooding from various sources including rivers and seas for Flood Zoning classification.

5.4 This mapping (Figure 5.1) indicates that the site is located entirely within Flood Zone 1, an area with a low probability of flooding occurring (<1:1000 yr).

5.5 Given the above the risk to the site from this source of flooding is considered to be **Very Low.**

Figure 5.1 – Environment Agency Flood Map



Fluvial Flooding

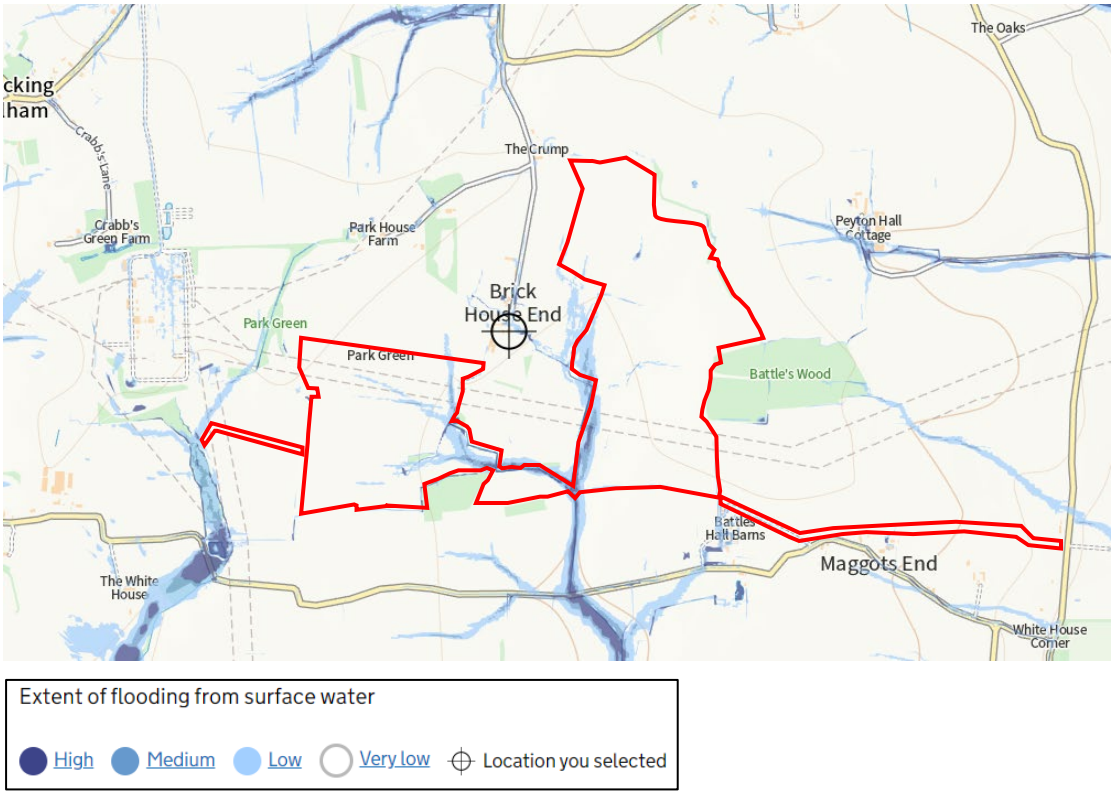
5.6 The site is entirely located within Flood Zone 1, an area with a low probability of flooding occurring (<1:1000 yr).

5.7 Given the above, Fluvial Flood risk to the site is considered to be **Very Low.**

Pluvial Flooding

5.8 The Surface Water (Pluvial) Flood Map (Figure 5.2) indicates that the majority of the site is at a very low risk from surface water flooding. There are some areas of high and medium risk indicated where the field drain ditch is located through the southern part of the site and where various low spots have occurred within the fields.

Figure 5.2 – Environment Agency Surface Flooding Map



5.9 The maps show the flood depths to be between 0 – 0.3m and 0.3 – 0.9m. During the proposed surface water drainage design, these areas can be picked up and redesigned so as to accommodate any existing overland flows and potential surface water flows using sustainable drainage techniques and positive drainage techniques where applicable.

5.10 Therefore, the development is considered to be at **Low** risk of flooding from surface water flows.

Historic Flooding

5.11 The SFRA lists the sources of historic flood risk as flows:

There is a reasonably good record of historical flooding within the District. The region is prone to localised flooding, with the main source of flooding from fluvial and surface water sources. Within recent years the February 2014 and October 2001 events have been the most serious, leading to widespread flooding across the District.

5.12 The SFRA provides a summary of the areas affect by major flood events:

- 10th November 1875: Saffron Walden.

- 5th August 1917: Saffron Walden.

- 19th September 1960: Saffron Walden.

- Summer 1987: Ashdon.

- October 2001: Clavering, Manuden, Stansted, Mountfitchet, Great Chesterford, Littlebury, Newport, Saffron Walden, Little Walden, Great Dunmow, Ashdon.

- January 2003: Widespread across district.

- 14th June 2007: Ashdon.

- 7th February 2014: Saffron Walden, Newport, Wendens, Ambo, Debden, Stansted, Arkesden, Ashdon, Quendon, Henham, Stansted, Mountfitchet.

- 23rd November 2014: Clavering, Berden, Manuden, Wimbish

5.13 It should be noted that from the above the site and surrounding area have not be indicated to have any historic flooding problems.

5.14 It is therefore considered that historic flooding at this site is **Very Low.**

Groundwater Flooding

5.15 The SFRA provides mapping that shows the risk from groundwater within the site extents as <25% and >=50% <75%.

5.16 The soilscapes website describes the soil information for the area as 'slightly impeded drainage'.

5.17 There are no known reports of flooding at this site occurring from groundwater.

5.18 The risk of flooding from groundwater at this stage is considered to be **Low.**

Flooding from Sewers

Flooding from Adopted Sewers

5.19 The site is within open fields and no known flooding from this source is known to have been reported/recorded in the area.

Flooding from Private Drainage

5.20 Due to the topography of the surrounding area any flood water from the development would follow the natural gradient towards the field drain ditches.

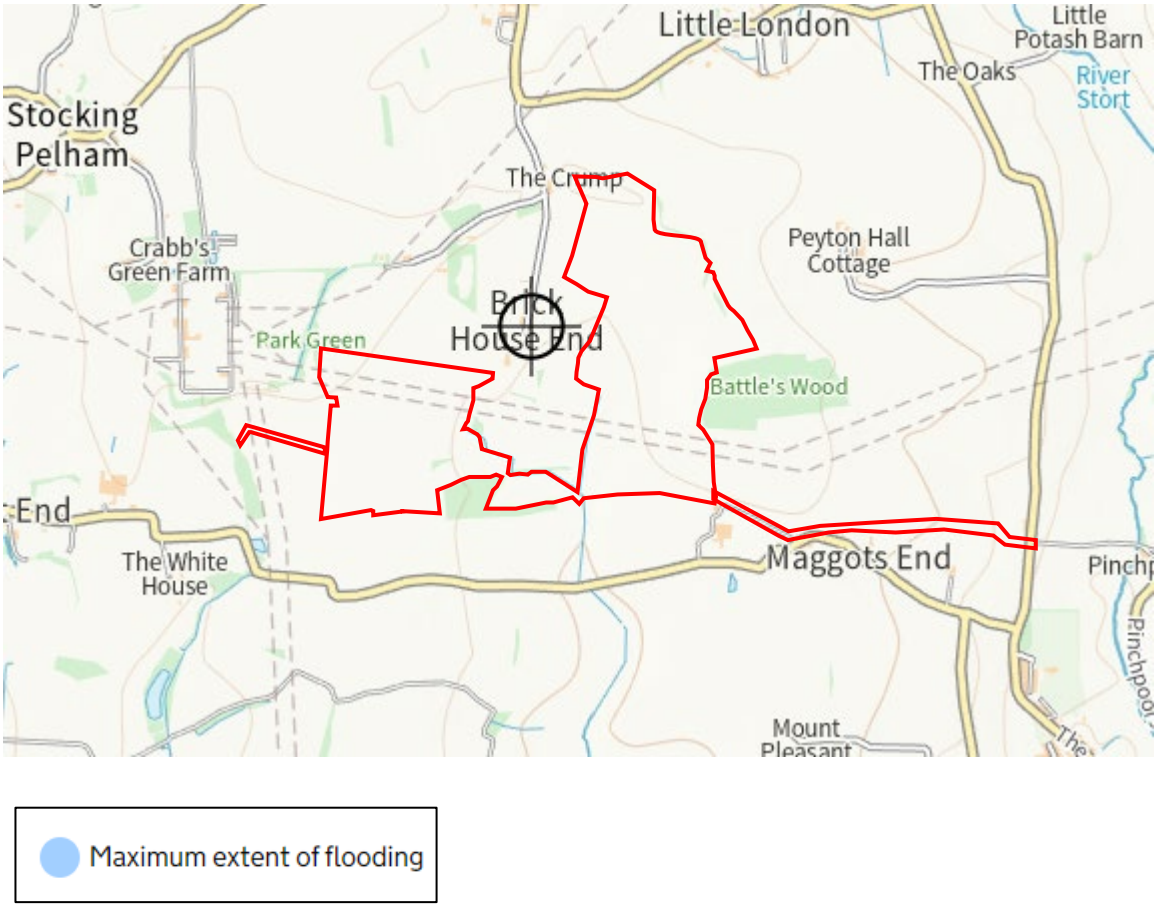
5.21 Therefore, the risk of sewer flooding to the site is therefore considered to be **Very Low.**

Flooding from Artificial Sources

5.22 From the EA map in Figure 5.3, it can be seen that there is a no risk from reservoirs flooding to the site.

5.23 Given the above the risk of flooding is from this source is considered to be **Very Low.**

Figure 5.3 – Environment Agency Flooding from Reservoir Map



Post Development Residual Flood Risk Summary

5.24 The risk of flooding is summarised in Table 5.1:

Table 5.1 – Flood Risk to the site from all sources

Flood Source	Flood Risk	Mitigation/Comments
Tidal	Very Low	• The site is entirely in Flood Zone 1 and is currently not at risk from Tidal Flooding.
Fluvial	Very Low	• The site is majority in Flood Zone 1 and is currently not at risk from Fluvial Flooding.
Pluvial	Low	• The EA flood maps show the majority of the site has a very low - low probability of flooding

		from surface water, with small areas of high risk highlighted. • The site will be designed to accommodate any future surface water run-off.
Historic	Very Low	• The Level 1 SFRA shows the site has not been recorded as being flooded from any source. • No mitigation measures are required.
Groundwater	Very Low	• The site is underlain by Chalk Formation.
Sewers	Very Low	• The site is within green fields away from known sewer runs. The site will be naturally drained with no positive drainage system present. • No mitigation measures are required.
Artificial	Very Low	• There is no flood risk shown from reservoirs to the site or surrounding areas.

Access & Egress

5.25 The site is for a solar farm which, apart from regular maintenance requirements, will remain unmanned and unpopulated.

5.26 The site is not subject to any form of severe flooding, therefore in the event of an extreme event occurrence, access and egress to/from the site can be easily achieved to higher parts of the site as necessary.

6. FLOOD DEFENCES AND MITIGATION

6.1 The SFRA provides mapping of all known flood defences within the settlement areas. There are no defences present within or in the vicinity of the site.

Finished Levels and Flood Resistance

Solar Panels Specification

6.2 The proposed solar panels mounting structure will be a 'fixed system' and will be manufactured from galvanised steel sections. The vertical supports are to be driven directly into the ground with no need for concrete foundations. The panels are mounted above the ground and so are not expected to interfere with any overland flow routes.

Primary and Inverter Substations

6.3 The development site will consist of inverters and a substation to connect to underground electrical cables.

6.4 Minor excavation and levelling will be required to prepare a support pad for the substation and inverter units.

6.5 In line with the potential shallow and local surface water or groundwater flooding that may occur on site and with reference to standard design specifications used by electricity providers, it is recommended to raise the finished floor levels to a minimum of 150mm above existing ground levels and to locate vulnerable equipment away from areas where flood risk is higher.

Surface Water Runoff & Impermeable Areas

6.6 The increase in impermeable surface area from the proposed development site is summarised in the table below.

Table 6.1 – Increase in Impermeable Surface Area

Infrastructure/Features	Increase in surface Area
Solar Panels	Although the sloped panels will deflect precipitation, the panels will **not** increase the impermeable area of the site. The area covered by the panel vertical supports is considered negligible.
Maintenance Access Track	12,534^2 (made up of gravel but may become compacted over time and provide run off)
Inverters, batteries, customer switchgear and DNO substation	1,200m^2
Transformer Compound	1,232m^2
	Total = 14,975m² (Approximately)

6.7 The proposed development will only increase the percentage impermeable surface area by 1.89%.

6.8 Consequently, the run-off from the post-development site would remain almost exactly as the existing land use. It is therefore proposed to allow the development to drain to the soil surface, where infiltration to the underlying soils would occur, to mimic the existing hydrological characteristics of the site.

6.9 It is important that development does not increase run-off from the site and thereby increase the risks of flooding for others. There may be risks associated with soil compaction or degradation during construction or brought about by the rain-shadows under the panels.

6.10 However, many such risks also exist with modern farming practices. It is therefore recommended that following installation of the panels the site is chisel-ploughed or

similarly cultivated and seeded with native meadow grass and wild flowers. Chisel-ploughing will reduce soil compaction on the site and promote seed growth; it has been proven to significantly increase infiltration rates thereby reducing runoff rates from the site. Additionally, longer meadow type grasses and wild flower vegetation provide high levels of natural attenuation which will serve to reduce the risks of erosion and limit surface water flows across the site. With the implementation of chisel-ploughing, changing the site's primary function to solar power generation will have several potential longer-term benefits regarding surface water runoff rates.

6.11 The absence of intensive farming activity will provide the following benefits which serve to reduce soil compaction and runoff rates from the site:

- The field will not be left without vegetation coverage in the winter (if in arable production);
- The field will not be intensively trodden or over grazed; and
- The field will not be regularly traversed by heavy machinery.

6.12 Using the site for solar power generation therefore has the potential to provide betterment to the existing land use in terms of surface water runoff rates and downstream flood risk.

7. PROPOSED DRAINAGE STRATEGY

Surface Water Management

7.1 The SuDS hierarchy demands that surface water run off should be disposed of as high up the following list as practically possible:

- Into the ground (infiltration) and re-use, or then;
- To a surface water body, or then;
- To a surface water sewer, highway drain or another drainage system, or then;
- To a combined sewer.

7.2 Given the nature of the development it is intended to let the sites drain surface water away as per the current situation (i.e. to ground and overland toward an existing watercourse).

7.3 Whilst this is a sensible approach there are other sources of sustainable drainage options available which will assist in slowing/managing flows and also improve on water quality.

7.4 In order to determine the most suitable method of surface water disposal from the site the options listed above have been considered as follows:

Infiltration rates

7.5 Given the underlaying strata of the site is "Lime-rich loamy and clayey soils with impeded drainage" it is unlikely that soakaways can be used effectively. However, soakaway testing has not been requested at this time.

Surface Water Body

7.6 The next option in the SuDS hierarchy is to dispose of surface water runoff into a nearby surface water body. The existing field drain ditch running within the southern part of the site is the nearest water body for the majority of the site.

SuDS selection process

7.7 Various methods of SuDS (Sustainable Drainage Systems) usage should be considered, but different methods have constraints attached to them that may not be suitable for this development. Therefore, an assessment of the suitability of different SuDS techniques have been made, which is summarised in the table below. Guidance from 'The SuDS manual' C753 has been used to form the basis of this assessment.

Table 7.1 – Assessment of SuDS Suitability

SuDS Technique	Potentially suitable for this development	Justification
Rainwater Harvesting	No	Not appropriate to the proposed development proposal.
Green Roofs	No	Not appropriate to the proposed development proposal.
Infiltration Systems (Soakaways, etc.)	Not likely	Given the existing below ground strata infiltration is unlikely on site.
Filter Drains	Yes	Can be used adjacent to the proposed internal access roads and to the north.
Swales	Yes	Shallow swales are feasible throughout the site and are considered as part of the drainage strategy.
Bioretention Systems	No	Not appropriate to the proposed development proposal.
Trees	No	Area is greenfield and very vegetated with existing trees etc. No additional tree

		planting is deemed necessary/appropriate for the development.
Underground storage	No	Not deemed appropriate for development as overland sustainable methods will be utilised.
Detention basins & ponds	Yes	Although ponds / basin would be a suitable feature there is no clear space from them on site. This may be reviewed at detailed design stage.
Wetlands	No	Due to the nature of the site, this is not considered feasible.
Permeable Paving	No	Not appropriate to the proposed development proposal.

Surface Water Drainage Strategy

7.8 The surface water drainage design has considered the use of SuDS appropriate to the development and suitable solutions discussed in the previous section.

7.9 It is proposed to allow the site to drain as close as naturally possible to the existing situation with run-off intercepted by a series of shallow swales / filter trenches adjacent to the proposed new internal access roads and swales located at the low parts of the site to collect and slow surface water run-off prior to discharging to the existing watercourses previously named.

7.10 The proposed development site will not affect the existing permeable areas, apart from very small areas as previously discussed, and run-off will be as existing greenfield rates, with additional sustainable features added to slow flows and also improve water quality.

7.11 The proposed drainage strategy layout can be found at **Appendix C**.

Water Quality

7.12 The SuDS Manual (CIRIA C753) states that the design of surface water drainage should consider minimising contaminants in surface water runoff discharged from the site. The level of treatment required depends on the proposed land use, according to the pollution hazard indices.

7.13 The developed land will be predominantly used for solar panels with some associated infrastructure and access roads. The development is considered to produce little to no pollution from surface run off onto the ground. Over land flows through grass will then pass along SuDS features such as swales which will provide additional water quality improvements to already low polluted water.

8. SUMMARY

8.1 The site is entirely greenfield with an existing field drain ditch running through the southern part of the development area.

8.2 It is proposed to redevelop the site for a new solar farm.

8.3 The site is located entirely within Flood Zone 1.

8.4 The proposed development will not add any significant areas of impermeable surfacing. Surface water runoff will drain partially to ground, as existing, and overland flows collected via new swale systems to slow run-off and improve water quality.

8.5 The proposal is considered to accord with the requirements of the National Planning Policy Framework (NPPF) with residual risk to the site fully mitigated, and as such considered low risk.

Appendix A – Topographical Survey

228300.00 N

228200.00 N

228100.00 N

APPROX.

228000.00 N

227900.00 N

227800.00 N

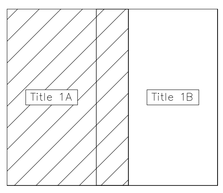
546200.00 E

546300.00 E

546400.00 E

546500.00 E

SHEET LAYOUT



STANDARD REFERENCES

ABBREVIATIONS

bb	belisha beacon	ko	kerb outlet
bl	bollard	lp	lamp post
brw	brick ret. wall	mh	manhole
bs	bus stop	mk	marker post
bt	telecoms cover	np	nameplate (road)
bw	brick wall	obf	open boarded fence
catv	cable TV cover	p	post
cbf	closeboarded fence	pb	post box
cbrw	conc block ret. wall	ret.	retaining wall
cbw	conc block wall	re	rodding eye
cl	cover level	rg	road gully
clf	chainlink fence	rs	road sign
conc	concrete	rwp	rainwater pipe
cp	concrete post	sp	signpost
cws	combined sewer	srw	stone ret. wall
dk	drop kerb	sv	stop valve
ep	electricity pole	svp	soil vent pipe
ESS	Elec. Sub-Station	sw	stone wall
fb	flower bed	s/w	stay wire
fh	fire hydrant	sws	storm water sewer
fl	floor level	tcb	telephone callbox
fws	foul water sewer	tl	traffic light
g	gully	tp	telegraph pole
gsv	gas valve	utr	unable to raise
ic	inspection cover	vp	vent pipe
il	invert level	w'lap	woodlap fence
irf	iron railing fence	wm	water meter
jb	junction box	wp	wood post

Notes

1. This survey has been computed and drawn "true to scale" and relates to the OSTN15 GPS National Grid at a single point.
2. All levels are in metres and relate to the mean of the nearest five Ordnance Survey active GPS stations (OSGM15).
3. This survey was measured for a scale of 1:500, any subsequent enlargements should be verified on site.

Revisions

Anthony Brookes Surveys Ltd
LAND, GPS, BUILDING & ENGINEERING SURVEYORS

Unit 2 Thornbury Office Park
Midland Way
Thornbury
Bristol
BS35 2BS
TEL: (01454) 419 133
FAX: (01454) 501 711
e-mail: info@anthonybrookes.com
web: www.anthonybrookes.com

THE SURVEY ASSOCIATION
Regulated by RICS
VERIFIED
Certificate Number 15302
ISO 9001, ISO 14001

Surveyed	C Langslow	Date	July 2021
Drawn	C Langslow	Checked	July 2021

Drawing Title: Topographical Survey
Proposed Solar Site
Stocking Pelham
SG9 0JU

Client: Pegasus Group
First Floor, South Wing
Equinox North
Great Park Road
Almondsbury, BS32 4QL

Drawing No.	Rev	Scale A0 @
661/11694/1A		1:500

228300.00 N

228200.00 N

228100.00 N

228000.00 N

227900.00 N

227800.00 N

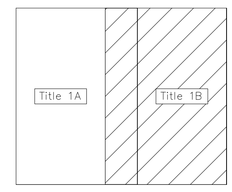
546500.00 E

546600.00 E

546700.00 E

APPROX.

SHEET LAYOUT



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cbw	conc block wall	re	rodding eye
cl	cover level	rg	road gully
clf	chainlink fence	rs	road sign
conc	concrete	rwp	rainwater pipe
cp	concrete post	sp	signpost
cws	combined sewer	srw	stone ret. wall
dk	drop kerb	sv	stop valve
ep	electricity pole	svp	soil vent pipe
ESS	Elec. Sub-Station	sw	stone wall
fb	flower bed	s/w	stay wire
fh	fire hydrant	sws	storm water sewer
fl	floor level	tcb	telephone callbox
fws	foul water sewer	tl	traffic light
g	gully	tp	telegraph pole
gsv	gas valve	utr	unable to raise
ic	inspection cover	vp	vent pipe
il	invert level	w'lap	woodlap fence
irf	iron railing fence	wm	water meter
jb	junction box	wp	wood post

Notes

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Revisions

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Unit 2 Thornbury Office Park
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Thornbury
Bristol
BS35 2BS
TEL: (01454) 419 133
FAX: (01454) 501 711
e-mail: info@anthonybrookes.com
web: www.anthonybrookes.com

THE SURVEY ASSOCIATION
Regulated by RICS
Certificate Number 15302
ISO 9001, ISO 14001

Surveyed	C Langslow	Date	July 2021
Drawn	C Langslow	Checked	July 2021

Drawing Title: Topographical Survey
Proposed Solar Site
Stocking Pelham
SG9 0JU

Client: Pegasus Group
First Floor, South Wing
Equinox North
Great Park Road
Almondsbury, BS32 4QL

Drawing No.	Rev	Scale A0 @
661/11694/1B		1:500

227900.00 N

227800.00 N

227700.00 N

227600.00 N

227500.00 N

548400.00 E

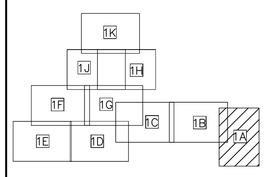
548500.00 E

548600.00 E

548700.00 E

APPROX.

SHEET LAYOUT



STANDARD REFERENCES

ABBREVIATIONS

bb	belisha beacon	ko	kerb outlet
bl	bollard	lp	lamp post
brw	brick ret. wall	mh	manhole
bs	bus stop	mk	marker post
bt	telecoms cover	np	nameplate (road)
bw	brick wall	obf	open boarded fence
catv	cable TV cover	p	post
cbf	closeboarded fence	pb	post box
cbrw	conc block ret. wall	ret.	retaining wall
cbw	conc block wall	re	rodding eye
cl	cover level	rg	road gully
clf	chainlink fence	rs	road sign
conc	concrete	rwp	rainwater pipe
cp	concrete post	sp	signpost
cws	combined sewer	srw	stone ret. wall
dk	drop kerb	sv	stop valve
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fh	fire hydrant	sws	storm water sewer
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g	gully	tp	telegraph pole
gsv	gas valve	utr	unable to raise
ic	inspection cover	vp	vent pipe
il	invert level	w'lap	woodlap fence
irf	iron railing fence	wm	water meter
jb	junction box	wp	wood post

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web: www.anthonybrookes.com

Surveyed	J Rodriguez	Date	March 2021
Drawn	J Rodriguez	Checked	March 2021

Drawing Title: Topographical Survey
Maggots End Solar Farm
Manuden
Herts

Client: Pegasus Planning Group Ltd
1st Floor, South Wing
Equinox North, Great Park Road
Bristol BS32 4QL

Drawing No.	Rev	Scale
661/11836/1A		A0 @ 1:500

228000.00 N

227900.00 N

APPROX.

227800.00 N

227700.00 N

547900.00 E

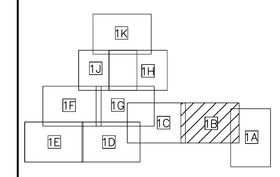
548000.00 E

548100.00 E

548200.00 E

548300.00 E

SHEET LAYOUT



STANDARD REFERENCES

ABBREVIATIONS

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cbw	conc block wall	re	rodding eye
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clf	chainlink fence	rs	road sign
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Surveyed	J Rodriguez	Date	March 2021
Drawn	J Rodriguez	Checked	March 2021

Drawing Title: Topographical Survey
Maggots End Solar Farm
Manuden
Herts

Client: Pegasus Planning Group Ltd
1st Floor, South Wing
Equinox North, Great Park Road
Bristol BS32 4QL

Drawing No.	Rev	Scale A0 @
661/11836/1B		1:500

228000.00 N

227900.00 N

227800.00 N

227700.00 N

547400.00 E

547500.00 E

547600.00 E

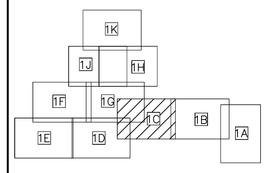
547700.00 E

547800.00 E

547900.00 E

APPROX.

SHEET LAYOUT



STANDARD REFERENCES

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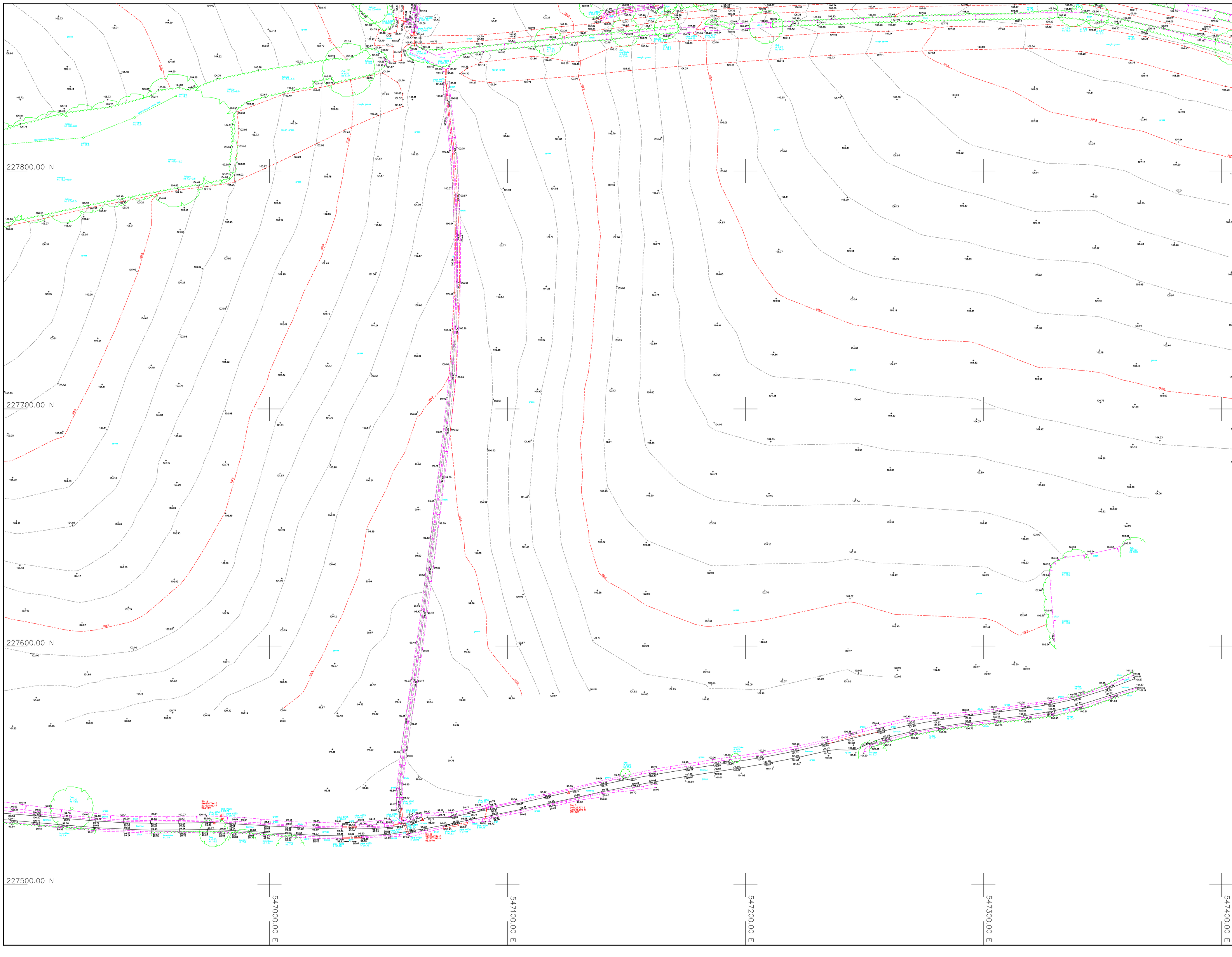
Surveyed	J Rodriguez	Date	March 2021
Drown	J Rodriguez	Checked	March 2021

Drawing Title: Topographical Survey
Maggots End Solar Farm
Manuden
Herts

Client: Pegasus Planning Group Ltd
1st Floor, South Wing
Equinox North, Great Park Road
Bristol BS32 4QL

Drawing No.	Rev	Scale AO
661/11836/1C		1:500



SHEET LAYOUT

STANDARD REFERENCES

ABBREVIATIONS

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bl	bollard	lp	lamp post
brw	brick ret. wall	mh	manhole
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Surveyed	J Rodriguez	Date	March 2021
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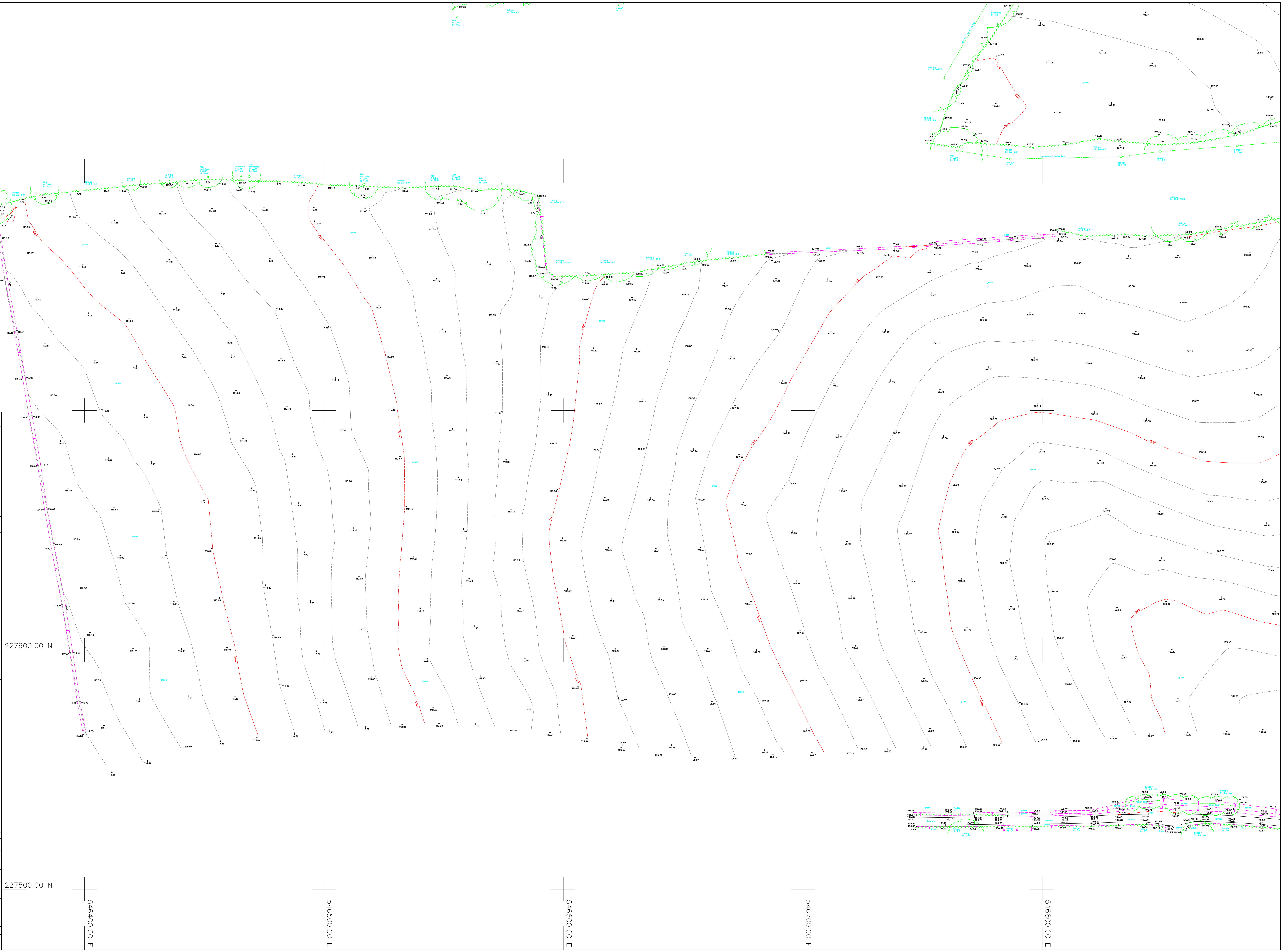
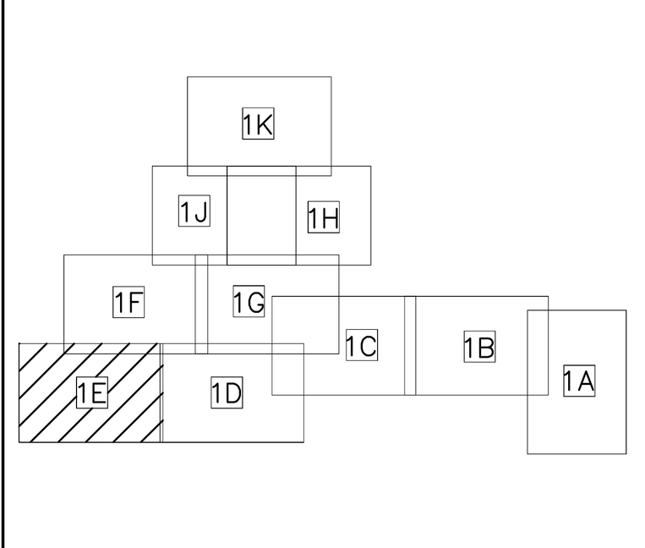
Drawing Title: Topographical Survey
Maggots End Solar Farm
Manuden
Herts

Client: Pegasus Planning Group Ltd
1st Floor, South Wing
Equinox North, Great Park Road
Bristol BS32 4QL

Drawing No.	Rev	Scale A0 @
661/11836/1D		1:500



SHEET LAYOUT



STANDARD REFERENCES

ABBREVIATIONS

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web: www.anthonybrookes.com

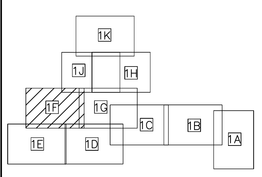
Surveyed	J Rodriguez	Date	March 2021
Drawn	J Rodriguez	Checked	March 2021

Drawing Title: Topographical Survey
Maggots End Solar Farm
Manuden
Herts

Client: Pegasus Planning Group Ltd
1st Floor, South Wing
Equinox North, Great Park Road
Bristol BS32 4QL

Drawing No.	Rev	Scale A0 @
661/11836/1E		1:500

SHEET LAYOUT



STANDARD REFERENCES

ABBREVIATIONS

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Surveyed	J Rodriguez	Date	March 2021
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Drawing Title: Topographical Survey
Maggots End Solar Farm
Manuden
Herts

Client: Pegasus Planning Group Ltd
1st Floor, South Wing
Equinox North, Great Park Road
Bristol BS32 4QL

Drawing No.	Rev	Scale
661/11836/1F		1:500 @ A0

228200.00 N

228100.00 N

228000.00 N

227900.00 N

546600.00 E

546700.00 E

546800.00 E

546900.00 E

547000.00 E

APPROX.

228200.00 N

228100.00 N

228000.00 N

227900.00 N

547100.00 E

547200.00 E

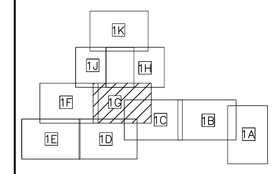
547300.00 E

547400.00 E

547500.00 E

APPROX.

SHEET LAYOUT



STANDARD REFERENCES

ABBREVIATIONS

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brw	brick ret. wall	mh	manhole
bs	bus stop	mk	marker post
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Surveyed	J Rodriguez	Date	March 2021
Drawn	J Rodriguez	Checked	March 2021

Drawing Title: Topographical Survey
Maggots End Solar Farm
Manuden
Herts

Client: Pegasus Planning Group Ltd
1st Floor, South Wing
Equinox North, Great Park Road
Bristol BS32 4QL

Drawing No.	Rev	Scale A0 @
661/11836/1G		1:500

228500.00 N

228400.00 N

228300.00 N

547200.00 E

547300.00 E

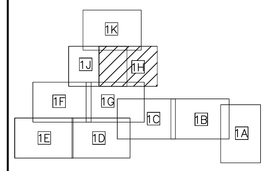
547400.00 E

547600.00 E

547700.00 E

APPROX.

SHEET LAYOUT



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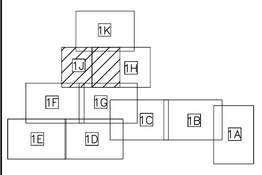
Surveyed	J Rodriguez	Date	March 2021
Drawn	J Rodriguez	Checked	March 2021

Drawing Title: Topographical Survey
Maggots End Solar Farm
Manuden
Herts

Client: Pegasus Planning Group Ltd
1st Floor, South Wing
Equinox North, Great Park Road
Bristol BS32 4QL

Drawing No.	Rev	Scale
661/11836/1H		1:500 @ A0

SHEET LAYOUT



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cp	concrete post	sp	signpost
cws	combined sewer	srw	stone ret. wall
dk	drop kerb	sv	stop valve
ep	electricity pole	svp	soil vent pipe
ESS	Elec. Sub-Station	sw	stone wall
fb	flower bed	s/w	stay wire
fh	fire hydrant	sws	storm water sewer
fl	floor level	tcb	telephone callbox
fws	foul water sewer	tl	traffic light
g	gully	tp	telegraph pole
gsv	gas valve	utr	unable to raise
ic	inspection cover	vp	vent pipe
il	invert level	w'lap	woodlap fence
irf	iron railing fence	wm	water meter
jb	junction box	wp	wood post

Notes

1. This survey has been computed and drawn "true to scale" and relates to the OSTN15 GPS National Grid at a single point.
2. All levels are in metres and relate to the mean of the nearest five Ordnance Survey active GPS stations (OSGM15).
3. This survey was measured for a scale of 1:500, any subsequent enlargements should be verified on site.

Revisions

Anthony Brookes Surveys Ltd
LAND, GPS, BUILDING & ENGINEERING SURVEYORS

Unit 2 Thornbury Office Park
Midland Way
Thornbury
Bristol
BS35 2BS
TEL: (01454) 419 133
FAX: (01454) 501 711
e-mail: info@anthonybrookes.com
web: www.anthonybrookes.com

Surveyed	J Rodriguez	Date	March 2021
Drawn	J Rodriguez	Checked	March 2021

Drawing Title: Topographical Survey
Maggots End Solar Farm
Manuden
Herts

Client: Pegasus Planning Group Ltd
1st Floor, South Wing
Equinox North, Great Park Road
Bristol BS32 4QL

Drawing No.	Rev.	Scale A0 @
661/11836/1J		1:500

APPROX.

228500.00 N

228400.00 N

228300.00 N

546900.00 E

547000.00 E

547100.00 E

547200.00 E

547300.00 E

547400.00 E

228900.00 N

228800.00 N

228700.00 N

228600.00 N

547100.00 E

547200.00 E

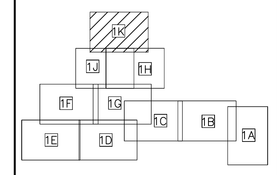
547300.00 E

547400.00 E

547500.00 E

APPROX.

SHEET LAYOUT



STANDARD REFERENCES

ABBREVIATIONS

bb	bellaha beacon	ko	kerb outlet
bl	bollard	lp	lamp post
brw	brick ret. wall	mh	manhole
bs	bus stop	mk	marker post
bt	telecoms cover	np	nameplate (road)
bw	brick wall	obf	open boarded fence
catv	cable TV cover	p	post
cbf	closeboarded fence	pb	post box
cbrw	conc block ret. wall	ret.	retaining wall
cbw	conc block wall	re	rodding eye
cl	cover level	rg	road gully
clf	chainlink fence	rs	road sign
conc	concrete	rwp	rainwater pipe
cp	concrete post	sp	signpost
cws	combined sewer	srw	stone ret. wall
dk	drop kerb	sv	stop valve
ep	electricity pole	svp	soil vent pipe
ESS	Elec. Sub-Station	sw	stone wall
fb	flower bed	s/w	stay wire
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Notes

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Drawing No.	Rev	Scale A0 @
661/11836/1K		1:500

Appendix B – Proposed Site Layout

A1

Revisions:

Revision	Date	Revision Notes	Drawn	Inspected
01	22.07.20	First Issue	PL	IL
02	25.08.20	Revised	HN	IL
03	23.11.20	Revised	PL	IL
04	24.11.20	Revised	PL	LM
05	08.01.21	Revised	JP	LM
06	15.03.21	Revised	HN	LM
07	17.03.21	Revised	PL	LM
08	23.03.21	Revised	HN	LM
09	29.03.21	Revised	PL	LM
10	07.04.21	Revised	HN	LM
11	12.04.21	Revised	PL	LM
12	16.04.21	**Revised**	**PL**	**LM**
13	16.04.21	**Revised**	**JP**	**LM**
14	22.07.21	**Revised**	**MC**	**LM**
15	22.07.21	**Revised**	**PL**	**LM**
16	22.02.21	**Revised**	**PL**	**LM**
17	12.08.21	**Revised**	**JP**	**LM**
18	27.08.21	Amendments to Red Line and Layout	MC	LM
19	27.08.21	Revised	JP	HJ
20	16.12.21	Revised	JP	HJ
21	12.01.22	Revised	JP	HJ
22	13.01.22	Amendment to Layout	GF	HJ
23	01.08.22	Amendment to Layout	GF	HJ
24	31.08.22	Red Line & Construction Access Amendment	AK	HJ

LEGEND:

- PROPOSED SITE
- DNO ACCESS
- CONSTRUCTION AND MAINTENANCE ACCESS
- SITE ACCESS
- NATIONAL GRID ACCESS
- CONSTRUCTION ACCESS
- PERIMETER FENCELINE
- PROPOSED CABLE ROUTE

SOLAR SITE INFRASTRUCTURE:

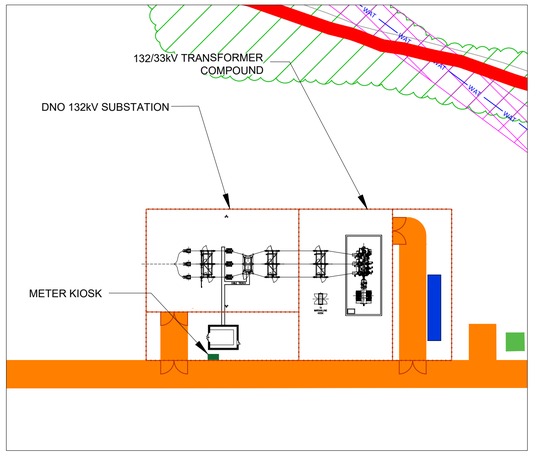
- DNO LV SUBSTATION
- CUSTOMER SWITCHGEAR
- SOLAR PANEL MODULES (PITCH 7m)
- METER KIOSK
- SECURITY GATE
- CCTV CAMERA
- INVERTER
- BATTERY

SERVICES:

- EASEMENT
- O/H ELEC CABLE
- U/G ELEC CABLE
- UKPN WAYLEAVE
- BRIDLEWAY
- FOOTPATH
- BYWAY
- WATER MAIN
- TELECOMS
- SCHEDULED MONUMENTS
- TEMP CONSTRUCTION COMPOUND
- LISTED BUILDINGS
- BADGER SETTS
- GREAT CRESTED NEWTS

ENVIROMENT

- EXISTING VEGETATION
- PROPOSED VEGETATION
- FLOWER RICH MARGINS



2 COMPOUND DETAIL VIEW

Scale: 1:500@A1

1 PELHAM SPRING SOLAR FARM INDICATIVE SITE LAYOUT

Scale: 1:5000@A1

SCALE 1:500 — 5 10 15 20 25 30 35 40 45 50m

SCALE 1:5000 — 100 200 300 400 500m

Overall panel counts and acreage				
Field Number	acres	useful acres	Panel count	Megwatts
1	6.28	2.46	1532	0.67
2	20.35	10.43	9604	4.22
3	58.54	41.04	39716	17.48
4	27	11.66	10656	4.68
5	54	46	40436	17.79
TOTAL	166.17	111.59	101,944	44.8

Status:

PLANNING

Project:

Pelham Spring Solar Farm

low carbon
powering tomorrow

2nd Floor Stirling Square, 5-7 Carlton Gardens
London SW1Y 5AD
Tel: +44(0)207 4060700
enquiries@lowcarbon.com www.lowcarbon.com

Drawing Title:

Pelham Spring Master Plan

Drawn:	Checked:	First Issued:
PL	TS	22.07.2020

Project Code: **LCS032-** Drawing Number: **MP-01**

Sheet Size:	Scale:	Revision:
A1	**A:N**	**25**

Appendix C – Proposed Drainage Strategy

PROPOSED SWALES TO RUN ALONG SIDE NEW ACCESS ROADS AND WITHIN SITE TO CONVEY OVERLAND FLOWS THROUGH SITE TO OUTFALL. SWALE TYPES TO BE A MIX OF DRY, WET AND CONVEYANCE SWALES

EXISTING GREENFIELD SITE TO DRAIN NATURALLY TO GROUND

EXISTING GREENFIELD SITE TO DRAIN NATURALLY TO GROUND

PROPOSED SWALES TO RUN ALONG SIDE NEW ACCESS ROADS AND WITHIN SITE TO CONVEY OVERLAND FLOWS THROUGH SITE TO OUTFALL. SWALE TYPES TO BE A MIX OF DRY, WET AND CONVEYANCE SWALES.

SWALE SYSTEM TO OUTFALL TO EXISTING WATERCOURSE. EXACT INVERT LEVELS TO BE CONFIRMED. LAND DRAINAGE CONSENT WILL BE REQUIRED FROM THE

EXAMPLES OF SWALE LAYOUTS

EXAMPLE OF DRY BASIN

TYPICAL SOLAR PANEL ARRANGEMENT RAISED ABOVE GROUND

KEY

PROPOSED SHALLOW SWALE. DEPTH VARY (APPROX. 0.5m - 1.0m DEEP) WITH 1:3 SIDE SLOPES. WIDTHS VARY.

OVERLAND FLOW ROUTE

First Floor, South Wing, Equinox
North Great Park Road,
Almondsbury, Bristol , BS32 4QL

01454 625945
www.pegasusgroup.co.uk
Planning | Design | Environment | Economics

REV	DATE	BY	DESCRIPTION	CHK	APD
A	03.09.2021	LAJ	SITE LAYOUT UPDATE, SCALE ALTERED	LAJ	NRF
B	27.07.2022.	MR	SITE LAYOUT UPDATE	LAJ	LAJ

CLIENT: LOW CARBON UK LTD	SCALE @ A1: 1:2000	CHECKED: LAJ	APPROVED: LAJ
PROJECT: PROPOSED SOLAR FARM, PELHAM SPRING (MAGGOTS END), BISHOPS STORTFORD	DATE: 24.03.2021	DESIGN-DRAWN: MR	DRAWING-STATUS: PLANNING
TITLE: PROPOSED DRIANAGE STRATEGY	PROJECT No: P20-1300	DRAWING No: 001	REV: B

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SWALE SYSTEM TO OUTFALL TO EXISTING WATERCOURSE. EXACT INVERT LEVELS TO BE CONFIRMED. LAND DRAINAGE CONSENT WILL BE REQUIRED FROM THE ENVIRONMENT AGENCY.

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REV	DATE	BY	DESCRIPTION	CHK	APD
A	03.09.2021	LAJ	SITE LAYOUT UPDATED, SCALE ALTERED	LAJ	NRF
B	27.07.2022.	MR	SITE LAYOUT UPDATE	LAJ	NRF

CLIENT: LOW CARBON UK LTD	SCALE @ A1: 1:2500	CHECKED: NRF	APPROVED: NRF
PROJECT: PROPOSED SOLAR FARM PELHAM SPRING (MAGGORS END) BISHOPS STORTFORD	DATE: 24.03.2021	DESIGN-DRAWN: LAJ	DRAWING-STATUS: PLANNING
TITLE: PROPOSED DRIANAGE STRATEGY	PROJECT No: P20-1300	DRAWING No: 002	REV: B