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PLANNING APPLICATION FOR BELVOIR SOLAR FARM

FLOOD RISK ASSESSMENT

BELVOIR ESTATE, GRANTHAM, LEICESTERSHIRE

ON BEHALF OF JBM SOLAR PROJECTS 10 LTD

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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1. INTRODUCTION

Background

1.1 Pegasus Planning Group Ltd has been appointed by JBM Solar Projects 10 Ltd (herein referred to as "the Applicant") to undertake a Flood Risk Assessment (FRA) for a proposed solar energy scheme at Belvoir Estate, Grantham, Leicestershire.

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 primarily 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 Leicestershire and Leicester City Level 1 Strategic Flood Risk Assessment (SFRA) dated October 2017.

Strategic Flood Risk Assessment

1.10 JBA Consulting undertook a Level 1 Strategic Flood Risk Assessment (SFRA) in October 2017 on behalf of Leicestershire County Council.

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:

1.13 "Local Plans should be supported by a strategic flood risk assessment and develop policies to manage flood risk from all sources, taking account of advice from the Environment Agency and other relevant flood risk management bodies, such as Lead Local Flood Authorities and Internal Drainage Boards. Local Plans should apply a sequential, risk-based approach to the location of development to avoid, where possible, flood risk to people and property and manage any residual risk, taking account of the impacts of climate change". (National Planning Policy Framework, paragraph 100)

1.14 The key objectives of the 2017 SFRA are:

- To provide up to date information and guidance on flood risk across Leicestershire County and Leicester City, taking into account the latest flood risk information and the current state of the national planning policy;

- To determine the variations in currant future flood risk from all sources of flooding in Leicestershire County and Leicester City;

- To identify the requirements for site-specific flood risk assessments;

- To consider opportunities to reduce flood risk to existing communities and developments;

- To enable the commissioning authorities to apply the Sequential Test and aid authorities in identifying when the Exception Test is requires, when determining preferred directions of growth; and,

- To inform the Sustainability Appraisal of the SGP, to that flood risk is taken into account when considering strategic growth options.

2. EXISTING SITE AND HYDROLOGY

Site Location & Existing Conditions

2.1 The site area is approximately 104.61 Ha in overall size and is entirely greenfield.

2.2 The site consists of approximately 16 agricultural fields which are accessed from Castle View Road that runs along the western site boundary. The Site is bounded by agricultural land to the west and south; Easthorpe Lane to the east leading to a farm compound with associated agricultural land, and the A52 (Bottesford Bypass) to the north. The A52 leads to Nottingham to the west and Grantham to the east.

2.3 The site has an existing watercourse (Winter Beck) flowing along part of the western boundary with an unnamed branch passing through the southern portion of the site. There are various ditches running throughout the site where shrubs provide field outlines and boundaries.

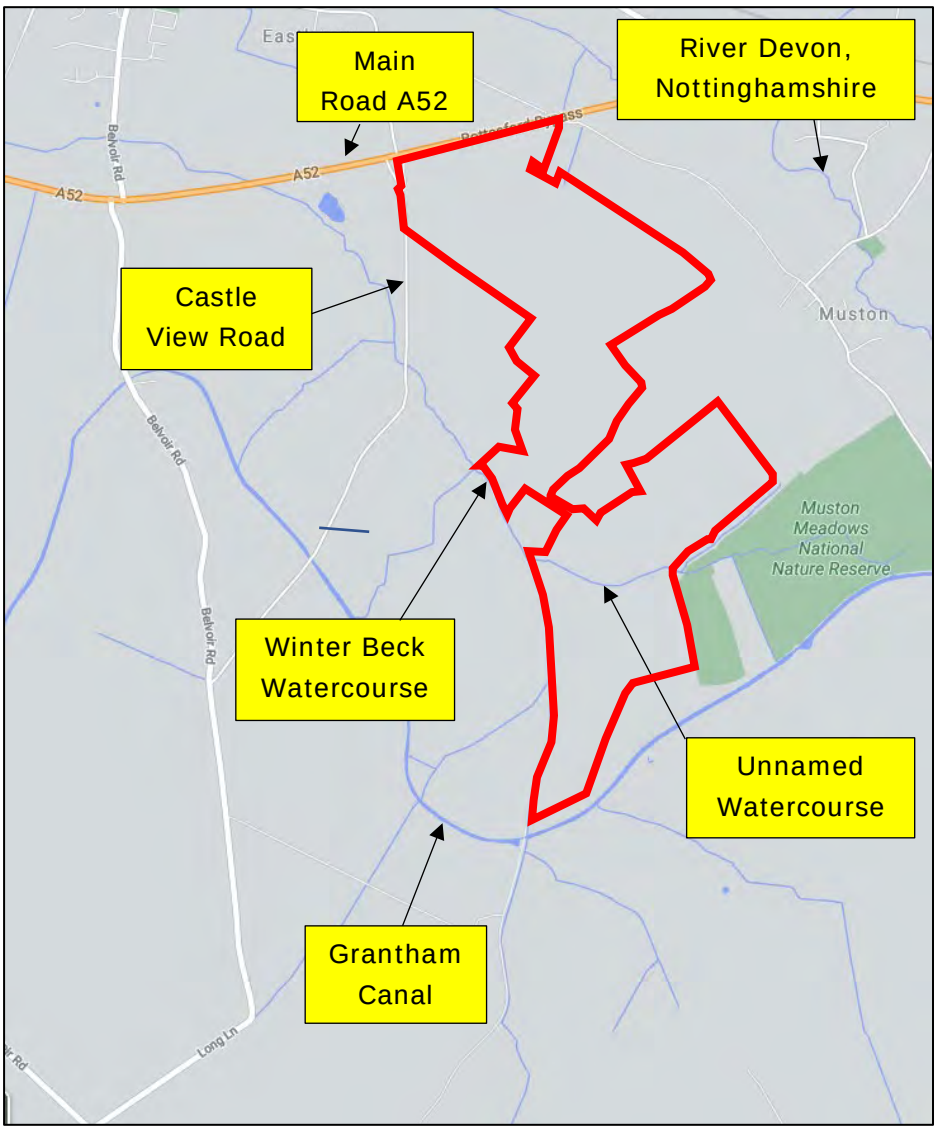
2.4 Approximately 300m past the site boundary to the east is the River Devon, Nottinghamshire and approximately 150m past the site boundary to the south is the Grantham Canal.

2.5 Approximate site co-ordinates are E: 481684; N: 337895, with the nearest post code NG13 0EA. The site is located off the Castle View Road, Easthorpe, Leicestershire.

2.6 The Environment Agency flood map shows the entire site as lying entirely within Flood Zone 1 (<1:1000 year probability of flooding) with solar panels located outside of the Flood Zone 3 areas along the Winter Beck watercourse.

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

Figure 2.1 – Site Location



2.8 Topographical survey undertaken by Tir 3D (reference 20017), show that the site generally falls from south to north, with levels ranging from approximately 46.2m AOD at the south of the site to approximately 34.5m AOD at the north-west of the site.

2.9 The topographical survey is included in **Appendix A.**

Existing Drainage and Hydrology

2.10 There is an existing water body adjacent to the site, this being Winter Beck running along the western boundary and the unnamed branch running through the south of the site.

2.11 There are believed to be existing sewer system networks within the vicinity of both parcels, however, public sewer records have not been requested at this stage.

2.12 Geological data held by the British Geological Survey (BGS) indicates that the bedrock geology underlying the site is a mix of both “Lodge Farm” and "Foston Member" Limestone, set in shallow lime-mud seas.

2.13 The Soilscape soils data shows the site as "Lime-rich loamy and clayey soils with 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 comprise of solar arrays on supports driven into the ground, linked by underground cables to inverters/transformers and a central 132kV substation which will feed the energy into the grid.

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 and substation/power station units.

3.4 The main construction and access will be via an existing access point from Castle View Road. A second operational access point to the south of the site will be for private use by the landowner only and is off an existing farm track.

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 categorises solar farms into 'essential infrastructure'.

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 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 There is a section of Flood Zone 3, an area with a high probability of river flooding (1:100 yr) located adjacent to the Winter Beck watercourse along part of the western boundary of the site.

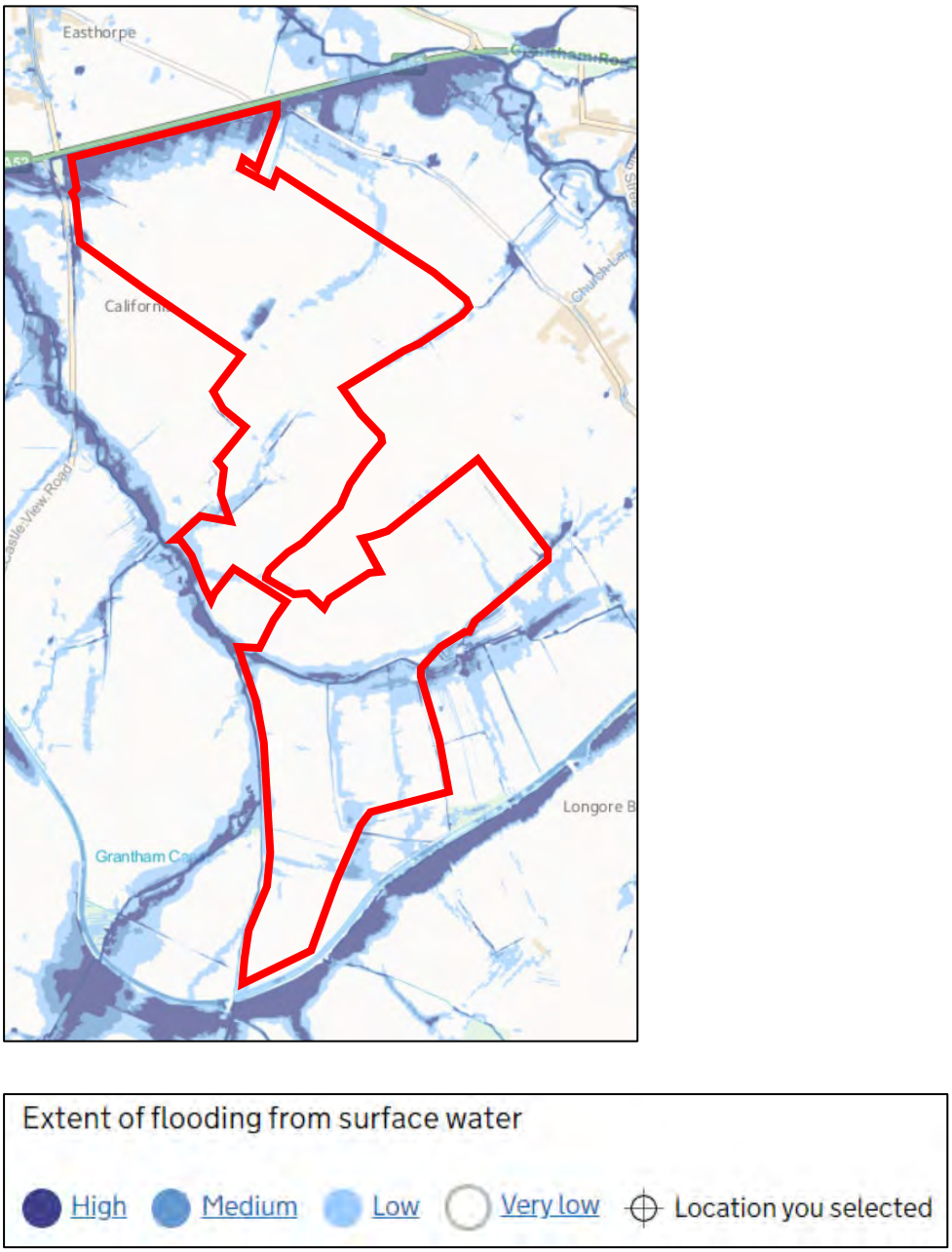
5.7 However, no development is proposed within this area and it is to be left as undeveloped flood zone area.

5.8 Given the above Fluvial Flood risk to the site is **Low.**

Pluvial Flooding

5.9 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 along the northern boundary part of the site and where various ditches and shrub lines are located.

Figure 5.2 – Environment Agency Surface Flooding Map



5.10 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 will 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.

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

Historic Flooding

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

There have been several recorded flood incidents across Leicestershire County and Leicester City, from a combination of sources. The earliest recorded incident was in November 1852 and the most recent records are from March 2016. Notable and more severe flood events to affect the county include the 1947 and Easter 1998 flood events. Several rural settlements have also been affected by the 1999 (December), 2000, Summer 2007, January 2008 and November 2012 flood events. Communities which have experienced frequent flooding include Market Harborough, Melton Mowbray, Great Glen, Burton Overy and Anstey. Prominent sources of flooding are fluvial, surface water, sewer and food incidents associated with water infrastructure issues such as culvert blockages or insufficient capacity in the sewer network.

5.13 The SFRA notes that, under Section 19 of the Flood and Water Management Act, Leicester City Council and Leicestershire County Council in their role as the Lead Local Flood Authority, have published flood investigation reports covering the following communities and events:

- Bardon Road in Coalville: June 2012

- Drome / Vercor Close in Coalville: June 2012

- Cothelstone Avenue in Loughborough: June 2012

- Main Street in Normanton: June 2012

- Mythe Lane in Witherley: June 2012

- Main Road in Sheepy Magna: July 2012

- Shenton Village: November 2012

- Bath Lane in Moira: November 2012

- Town Centre in Market Harborough: July 2013

- Rugby Close in Market Harborough: December 2013

- Main Street in Burton Overy, Harborough: June 2014

5.14 It should be noted from the recorded events above that the site and surrounding area have not been historically affected by flooding.

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

Groundwater Flooding

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

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

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

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

Flooding from Sewers

Flooding from Adopted Sewers

5.20 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

5.21 Due to the topography of the surrounding area any flood water from the development would follow the natural gradient which flows south-east to north-west towards the A52. The farm compound to the east is the only location near the site boundary with potential residents.

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

Flooding from Artificial Sources

5.23 From the EA map in Figure 5.3, it can be seen that there is a risk from reservoirs flooding to parts of the north and south of the site.

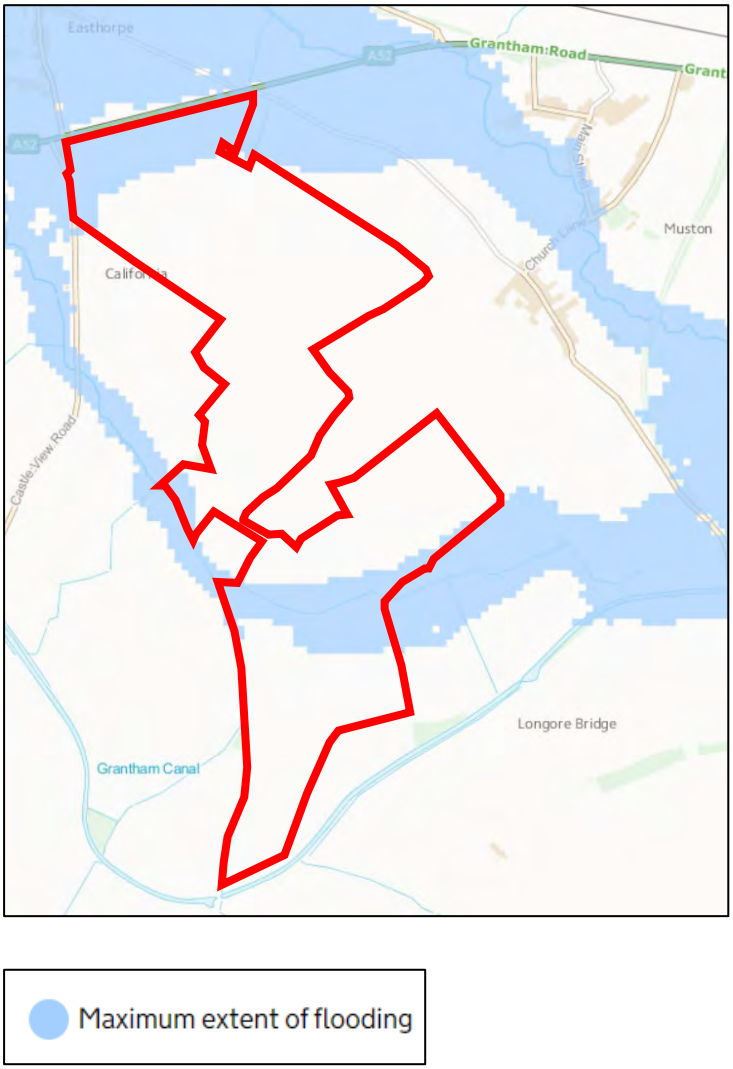
5.24 It is believed this is from the Belvoir Upper and Lower Lake as well as the Knipton Reservoir to the far south of the site.

5.25 The reservoirs are owned and maintained by The Belvoir Estate and Canal & River Trust. It should be noted that the risk of flooding from these sources are unlikely given the regular maintenance and reinforcement to known reservoirs. The SFRA states:

Reservoir flooding is very different from other forms of flooding. It may happen with little or no warning and evacuation will need to happen immediately. The likelihood of such flooding is difficult to estimate, but is less likely that flooding from rivers or surface water.

5.26 Should the reservoir breach in the future it should be noted that the site is not populated and will consist of only solar panels and access roads etc. Given the above the risk of flooding from this source is considered to be **Low.**

Figure 5.3 – Environment Agency Flooding from Reservoir Map



Post Development Residual Flood Risk Summary

5.27 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 in Flood Zone 1 and is currently not at risk from Tidal Flooding.
Fluvial	Low	• The EA flood maps show a small area to the west within Flood zone 3. No development

		shown within the flood zone area and site levels rise above the flood levels within the site.
Pluvial	Low	• The EA flood maps show the majority of the site has a very low - low probability of flooding from surface water, with a small areas 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.
Groundwater	Low	• The site is underlain by Bedrock geology of Limestone.
Sewers	Very Low	• The sites are 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	Low	• There is flood risk shown from reservoirs to the far south of the site. • Mapping data from the EA indicates flooding could occur in parts of the north and south of the site. • Given the standard of inspection and maintenance of reservoirs the risk is considered low. • No mitigation is required.

Access & Egress

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

5.29 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 lists 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 Specification

6.3 The development site will consist of inverters and a substation to connect to overhead power 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 25º 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.
Substation Compound	1855m^2
Inverters	686m^2
	Total = 2541m^2 (Approximately)

6.7 The proposed development will only increase the percentage impermeable surface area by 0.243%.

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 the existing watercourses).

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" it is unlikely that soakaways can be used effectively.

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 watercourse running along the western boundary 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	Yes	Area is greenfield and very vegetated with existing trees etc. Some additional tree planting is proposed.

Underground storage	No	Not deemed appropriate for development as overland sustainable methods will be utilised.
Detention basins & ponds	Yes	It is possible that shallow attenuation/infiltration basins can be provided where swales pass through larger open spaces within the site boundary, this will assist in slowing flows from the site.
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 It should be noted that an easement is required from the top of the bank along the existing watercourse of 9.0m. A Land Drainage Consent (LDC) will be required for connection to the watercourse.

7.11 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.

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

Water Quality

7.13 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.

7.14 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 existing watercourses located to the west and southern parts of the site as well as existing ditches throughout the development area.

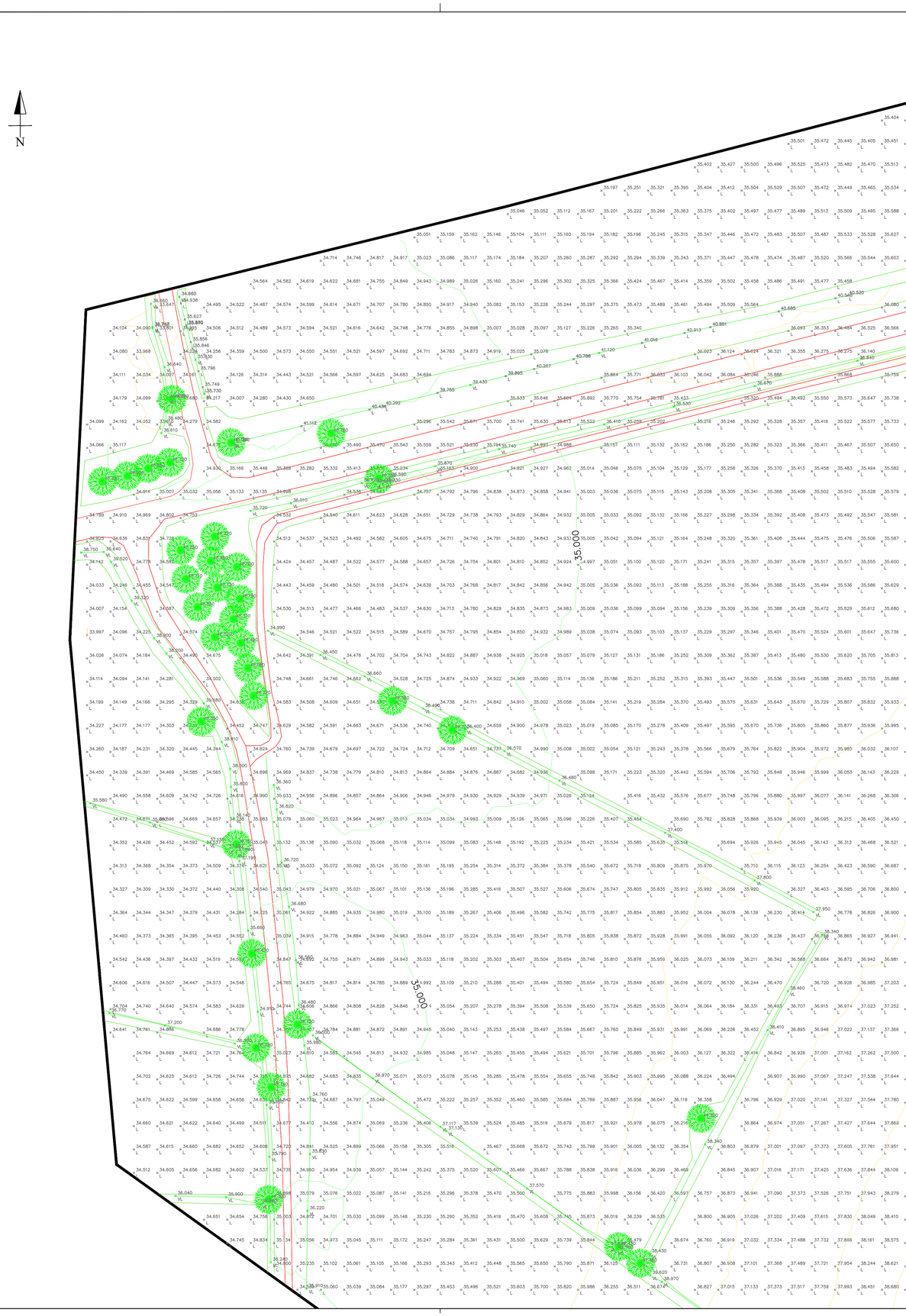
8.2 It is proposed to redevelop the site for a new solar park.

8.3 The site is located within Flood Zone 1, with a small area of Flood Zone 3 to the far west of the site adjacent to the existing Winter Beck watercourse.

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



Legend - Water / Drainage

CODE		
WBL		Water Bod Level
WTL		Water level
QUAY		Quay Wall
WAT		Water Edge
LOCK		Canal Lock
POND		Pond
WEIR		Weir
WELL		Well
ACO		Ace Drain
GL		Long gully
GU		Gully
	MH	Manhole Cover (Square)
	MH	Manhole Cover (Round)

Legend - Roads - Rail

RD	Road Carriageway
RC	Road Centre
	Road Markings White
	Road Markings Yellow
CUL	Culvert
DTC	Ditch
KT	Kerb Top
KB	Kerb Bottom
KBAC	Kerb Back
BS	Bus Stop
SR	Speed Ramp
TRK	Tracks
VE	Verge
RTRK	Rail Track
RS	Road Sign
	Bollard

Legend - Roads Markings

SWLD	Single White Line Dashed
SWL	Single White Line
SYLD	Single Yellow Line Dashed
SYL	Single Yellow Line
DWLD	Double White Line Dashed
DWL	Double White Line
DYLD	Double Yellow Line Dashed
DYL	Double Yellow Line
YB	Yellow Box

Legend - Buildings / Structures

BGF	Building Footprint
BGL	Building Line
	Apex
RI	Ridge
	Eaves
	Parapet
SOF	Soffit
FON	Foundations
CAN	Canopy - Overhead Features
	Container
PF	Prefab - Building
	Ruins
GH	Greenhouse
	Shed
	Steps
	Door
WIN	Windows
CEL	Cellars
CAB	Cabin
COL	Column
BRG	Bridge
LDR	Ladder
	Tank
	Platform
MONU	Monument

Legend - Services - Underground

CODE	
UA	Underground Anomaly
UCOM	Underground Combined
UF	Underground Foul
UG	Underground Gas
UP	Underground Power
US	Underground Storm
UT	Underground Telecom

Legend - Ground Features

	Gate
FE	Fences
	Pillars
WL	Wall
WT	Walls top
RLG	Railing
BT	Bank Top
BB	Bank Bottom
RWB	Retaining Wall Base
RWT	Retaining Wall Top
PATH	Pathway
HR	Handrail
RAMP	Ramps, loading bays
BR	Barrier
	Armco Barrier
	Rock
SC	Surface Change
	Tarmac
	Trench
CH	Channel
CHAM	Chamber
LDR	Ladder
	Cattle Grid
CONC	Concrete
	Bench / Seat
	Survey Station
	Contours (Major)
	Contours (Minor)

Legend -Vegetation

GRASS	Grass partitions
HE	Hedges
VL	Vegetation Line
	Tree Stump
	Bush
	Tree
	Tree - Young Sapling

Legend - Services

OHC	Overhead Cables
	Pipe
PIC	Power Inspection Cover
	Power Pole
	Stay
ESB	ESB Box (Pylon)
	Fire Hydrant
	Flower box
	Gas Valve
	Lamp Post
	Litter Bin
	Mast / Pylon
	Post Box
Telecom	Telecom Control Panel (Pillar)
Telecom	Telecom Cover
	Telecom Pole
	Traffic Lights
	Telephone box
IC	Cable TV Inspection Cover
	Water Valve
	Water Meter
AJ	Armstrong Junction
MNP	Minipillar
MNPP	Minipillar Power
MNPT	Minipillar Telecom
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Surveyed By: LiDAR	Drawn By: JH
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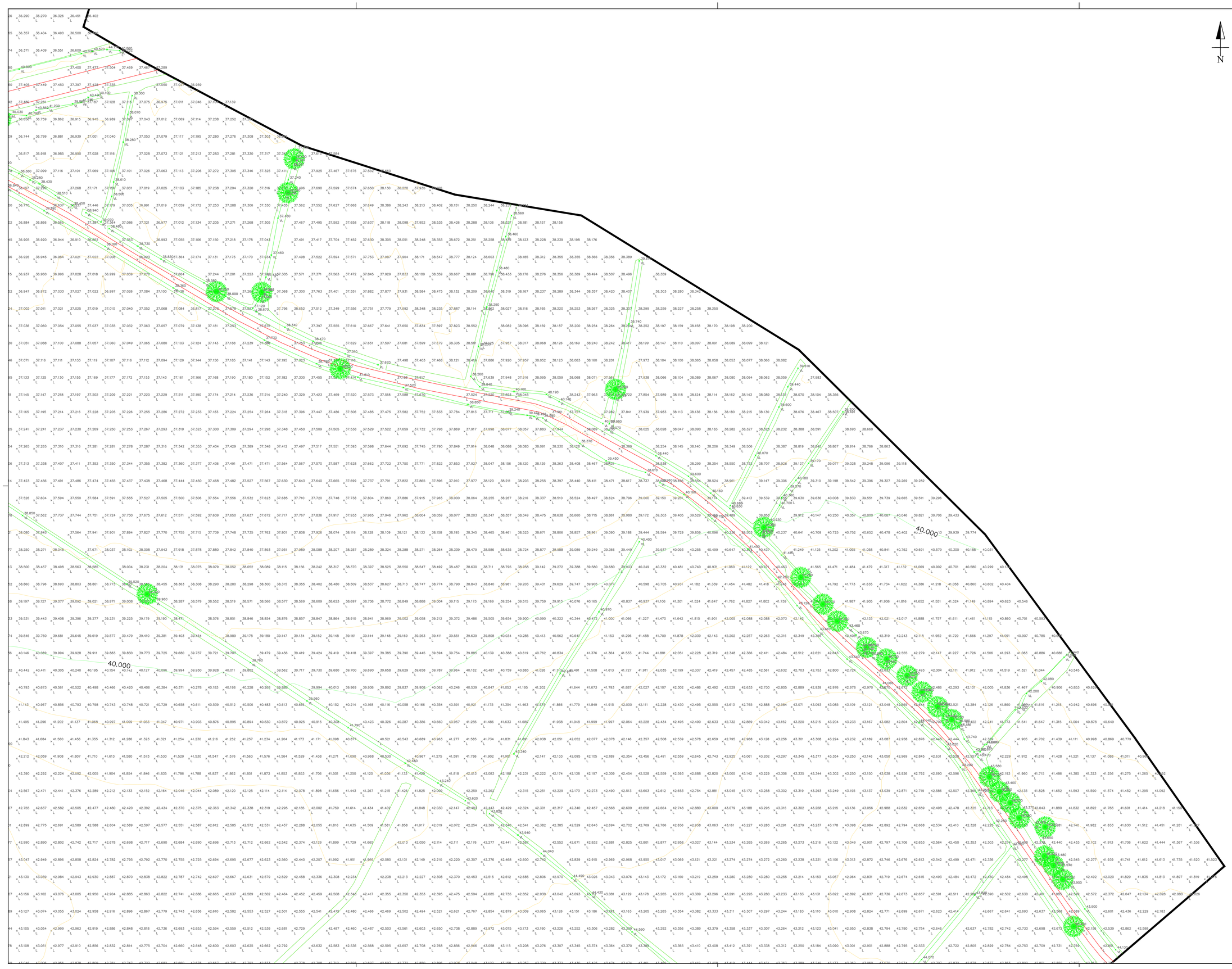

Legend - Water / Drainage

CODE		
WBL		Water Bed Level
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QUAY		Quay Wall
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LOCK		Canal Lock
POND		Pond
WEIR		Weir
WELL		Well
ACO		Aco Drain
GL		Long gully
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	MH	Manhole Cover (Square)
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Legend - Roads - Rail

RD	Road Carriageway
RC	Road Centre
	Road Markings White
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KT	Kerb Top
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BS	Bus Stop
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BGF	Building Footprint
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	Power Inspection Cover
	Power Pole
	Stay
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	Fire Hydrant
	Flower box
	Gas Valve
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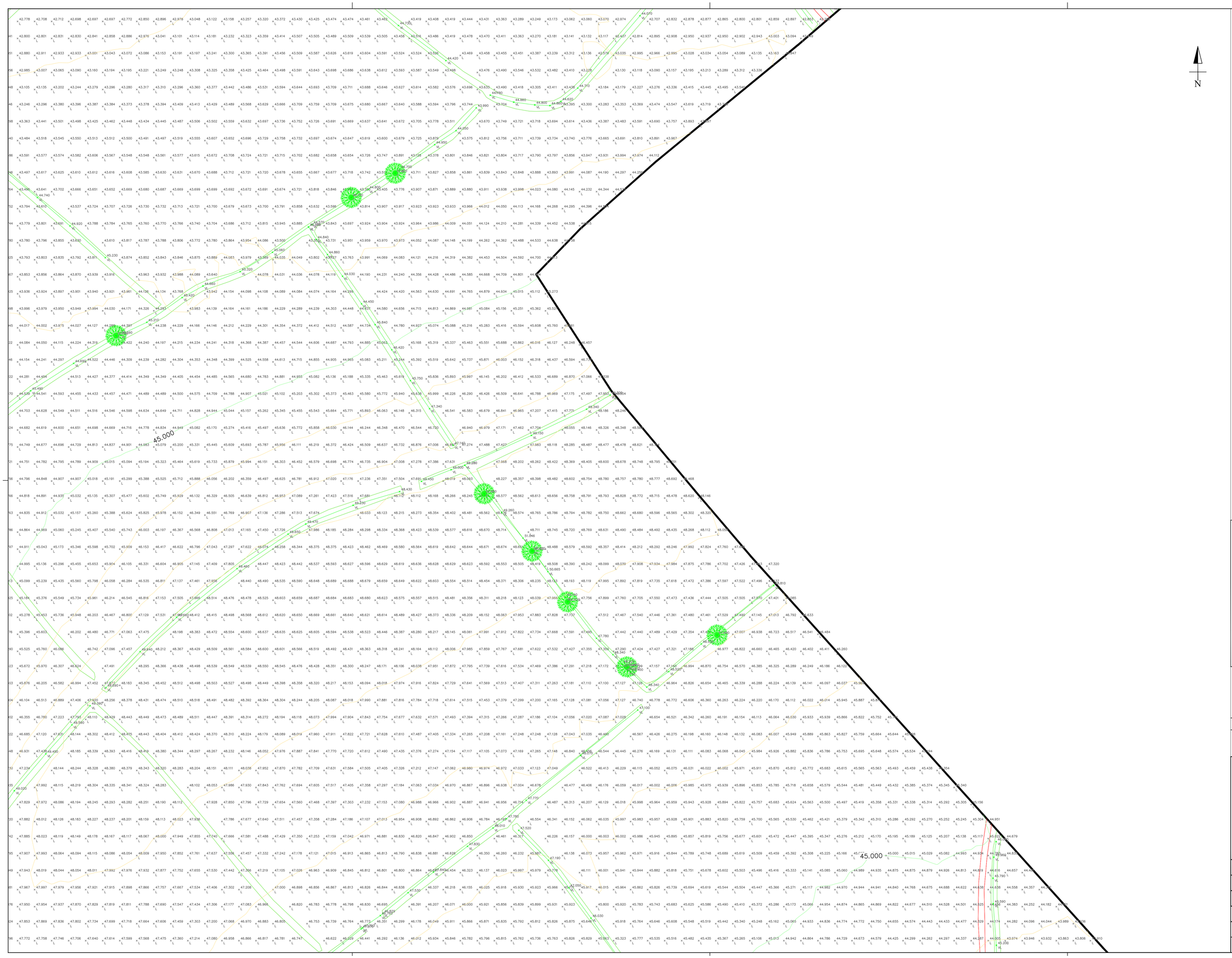

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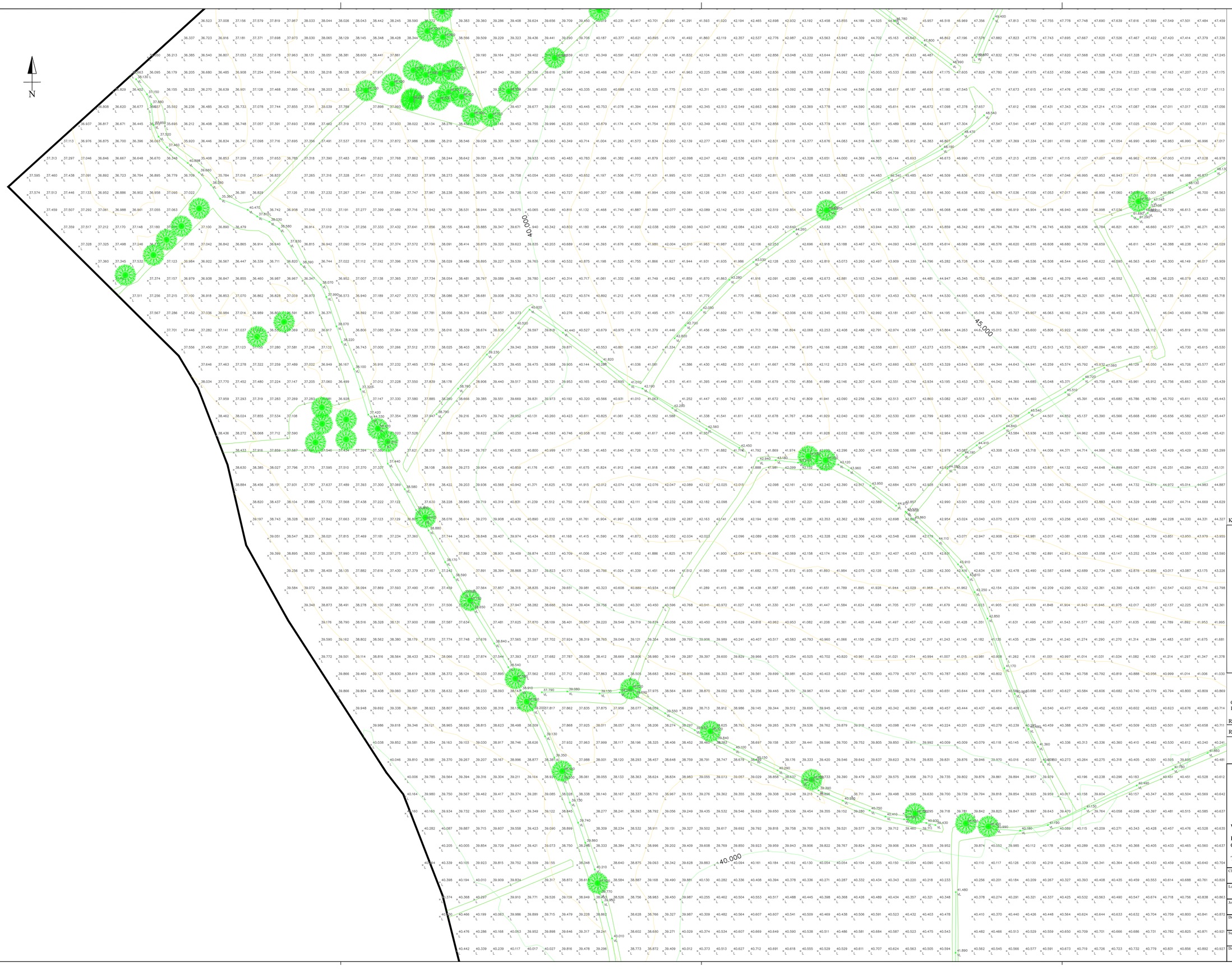

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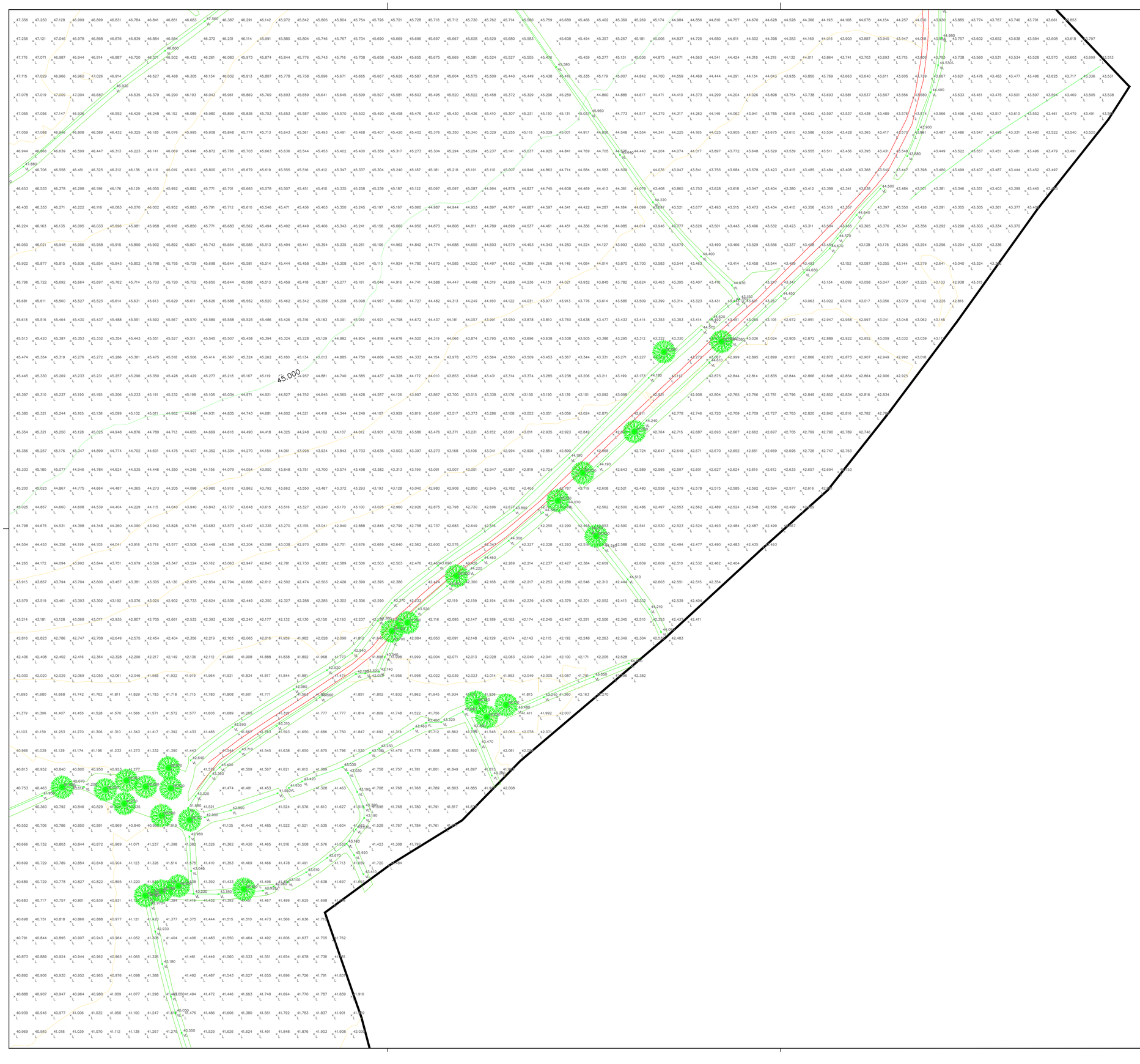

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the Survey people

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Head Office: The Grainstore, Singletons Lane, Bagenalstown, Co. Carlow, R21 XA66, Ireland;

Tel: +353 (0)59 97 23337 **Email:** info@tir3d.ie

Client:	JBM Solar
Location:	Belvoir
Job:	Aerial Topographical Survey
Drawing Number: 20017-001 G	Scale: 1:1,000 / A1
Surveyed By: LiDAR	Drawn By: JH
Date: Issued 19/02/2020	Checked By: XXX

Appendix B - Proposed Site Layout

N

REVISIONS:

– Initial design

Legend:

- Inverter
- Spare containers
- Customer switchgear container
- Solar panels
- Perimeter fence
- Water courses and water bodies
- Overhead lines
- Access road
- Gas pipe
- Access gate
- Tree Root protection areas
- Hedges and canopies
- Banks
- Planning Redline
- PROW

SCALE A1 @ 1:5000

0m 100m 200m 300m 400m 500m

JBM SOLAR

DATE: 15 November 2021

TITLE:
Belvoir PV layout

PROJECT TITLE:
Belvoir

LOCATION:
WR15 8LG

CONFIGURATION:
Typical tracker layout

49.9MW

REV: A

FILENAME: 20210630_49_1MIP540.dwg

Appendix C – Proposed Drainage Strategy