Belvoir Solar Farm

Appeal Ref: APP/Y2430/W/24/3340258
LPA Ref: 22/00537/FUL

Landscape and Visual Proof of Evidence
Appendices
August 2024

By LDA Design on behalf of JBM Solar Projects 10 Ltd

Appendix 1: Figures (including ZTV study)

Z:\9656_BELVOIR_SOLAR_FARM8GIS\PROJECTS\9656_01_SITE_LOCATION.APRX

LEGEND

- Site Boundary
- Study Area (5km)

LDĀDESIGN

PROJECT TITLE

BELVOIR SOLAR FARM

DRAWING TITLE

Appeal Site Location

ISSUED BY	Oxford	T:	01865 887 050
DATE	July 2024	DRAWN	SMc
SCALE @A3	1:50,000	CHECKED	PL
STATUS	Final	APPROVED	PL

DWG. NO. 9656_01

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

Sources: Ordnance Survey,

Z:\9656_BELVOIR_SOLAR_FARM\8GIS\PROJECTS\9656_02_LANDSCAPE_DESIGNATIONS.APRX

LEGEND

- Site Boundary
- Study Area (5km)
- Ancient Woodland
- National Nature Reserves
- Sites of Special Scientific Interest (SSSI)
- Scheduled Monuments
- Registered Park and Garden

Listed Buildings (Grade)

- I
- II*
- II

LDĀDESIGN

PROJECT TITLE

BELVOIR SOLAR FARM

DRAWING TITLE

Key Environmental Designations

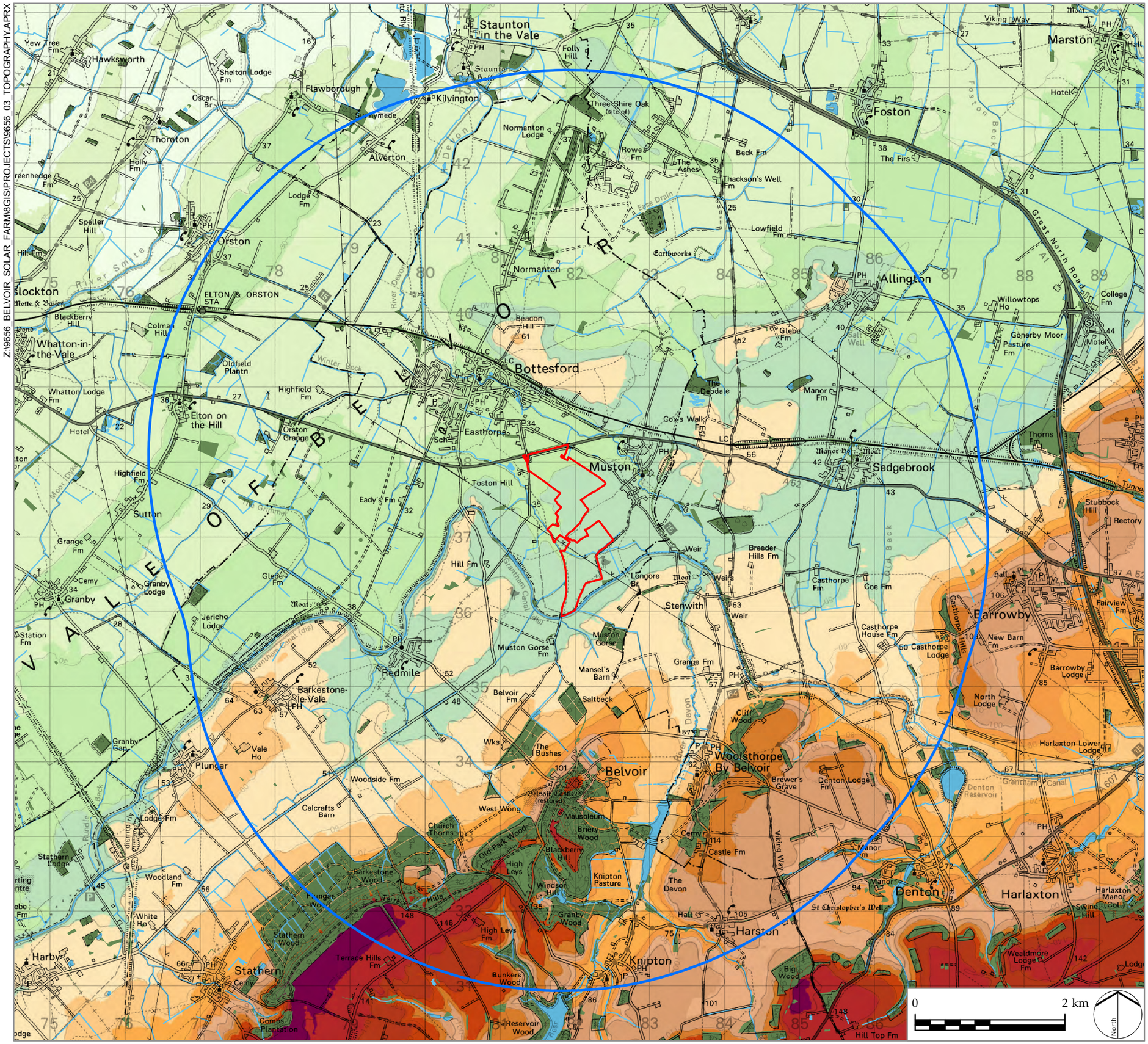
ISSUED BY	Oxford	T:	01865 887 050
DATE	July 2024	DRAWN	SMc
SCALE @A3	1:50,000	CHECKED	PL
STATUS	Final	APPROVED	PL

DWG. NO. 9656_02

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

Sources: Ordnance Survey, Natural England, Historic England, Forestry Commission

Z:\9656_BELVOIR_SOLAR_FARM\8GIS\PROJECTS\9656_03_TOPOGRAPHY.APRX



LEGEND

- Site Boundary
- Study Area (5km)
- Woodland
- Watercourses
- Waterbodies

Elevation (m AOD)

- < 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80
- 80 - 90
- 90 - 100
- 100 - 110
- 110 - 120
- 120 - 130
- 130 - 140
- 140 - 150
- 150 - 160
- > 160

LDĀDESIGN

PROJECT TITLE

BELVOIR SOLAR FARM

DRAWING TITLE

Topography, Woodland and Hydrology

ISSUED BY	Oxford	T:	01865 887 050
DATE	July 2024	DRAWN	SMc
SCALE @A3	1:50,000	CHECKED	PL
STATUS	Final	APPROVED	PL

DWG. NO. 9656_03

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

Sources: Ordnance Survey,

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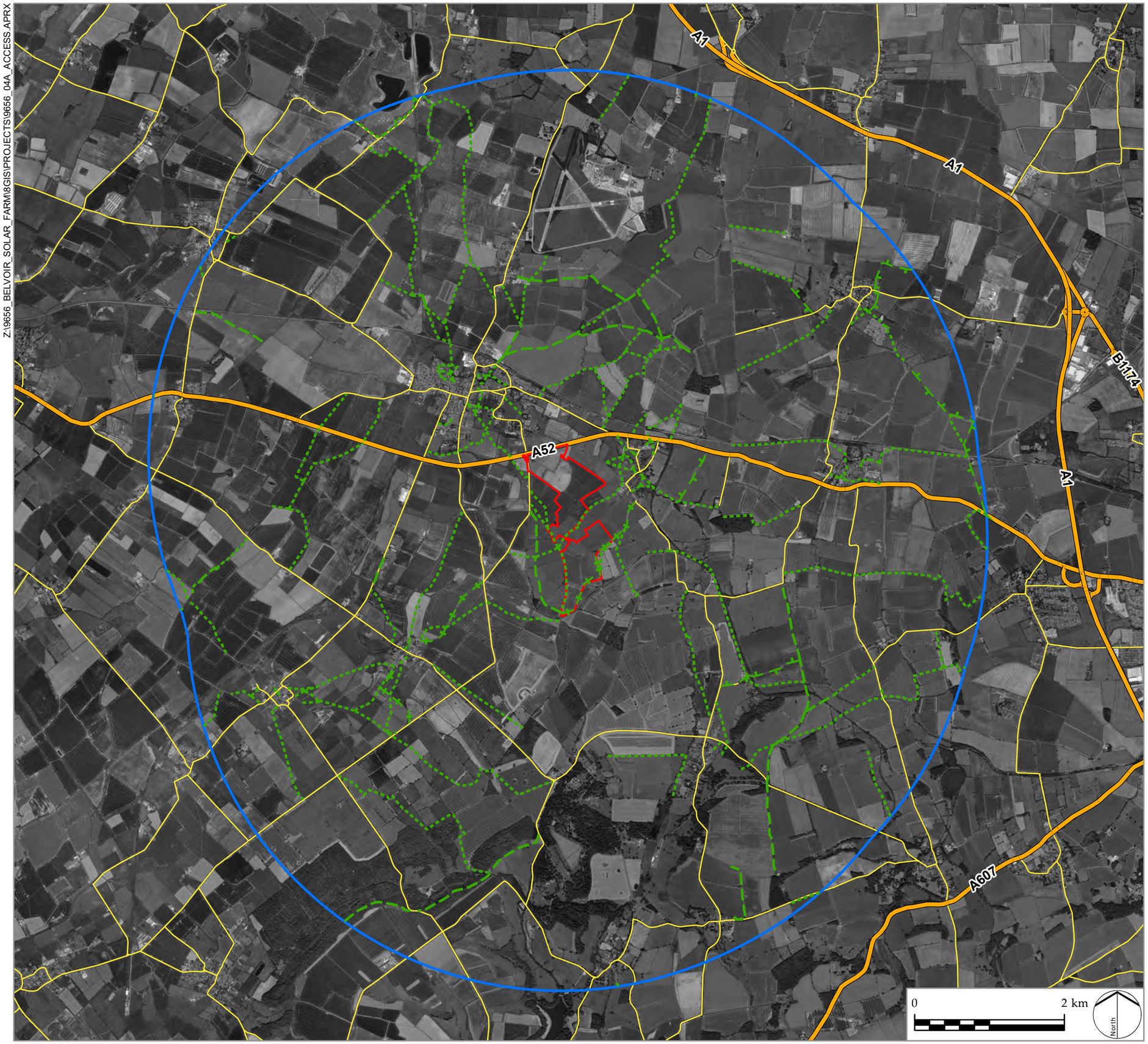

LEGEND

- Site Boundary
- Study Area (5km)
- Primary Road
- Secondary Road

Public Rights of Way (PROW)

- Footpath
- Bridleway
- Byways open to all traffic
- Restricted Byway

LDĀDESIGN

PROJECT TITLE

BELVOIR SOLAR FARM

DRAWING TITLE

Key Routes and PRoW

ISSUED BY	Oxford	T:	01865 887 050
DATE	July 2024	DRAWN	SMc
SCALE @A3	1:50,000	CHECKED	PL
STATUS	Final	APPROVED	PL

DWG. NO. 9656_04A

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

Sources: Ordnance Survey,

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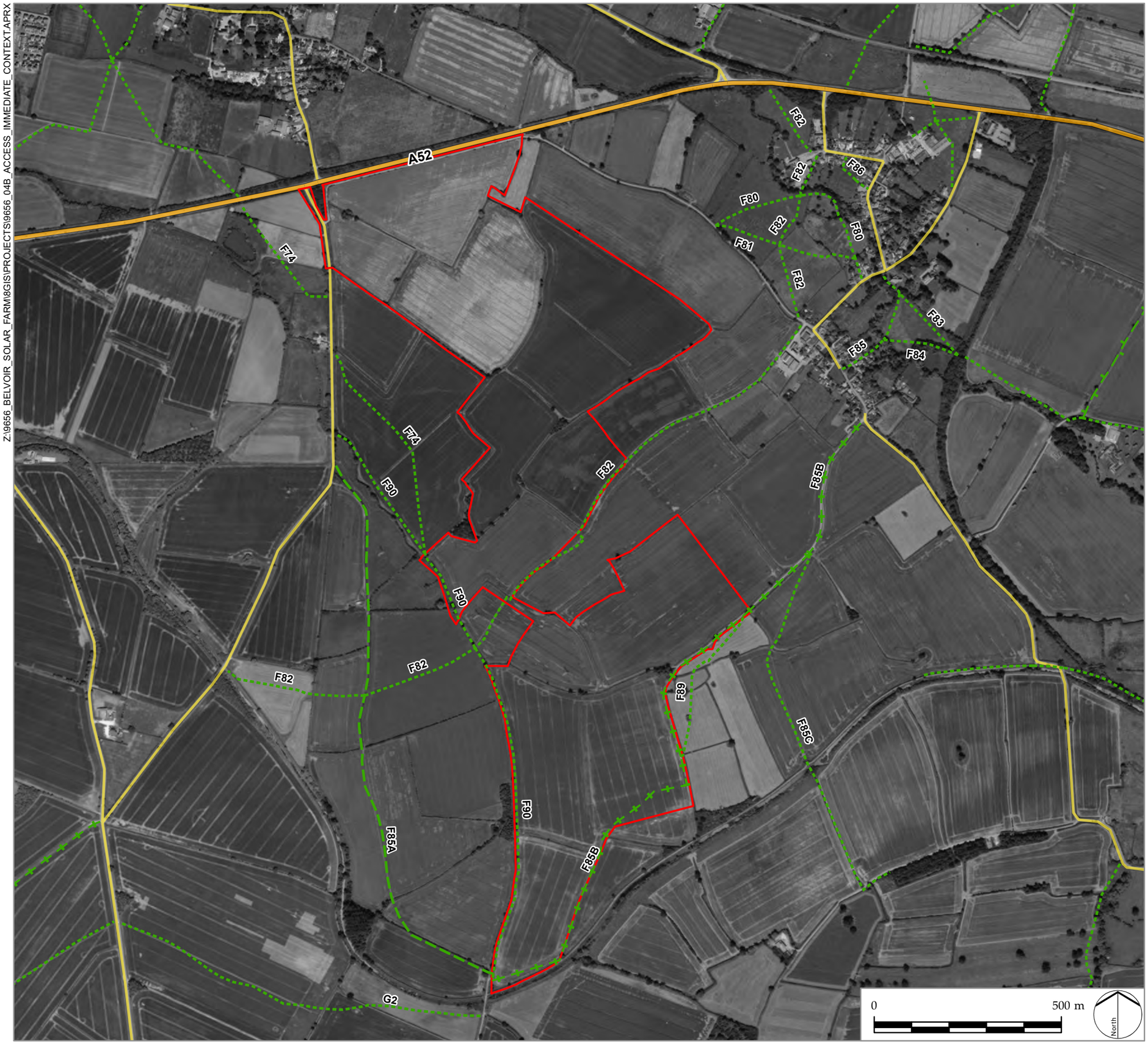


LEGEND

- Site Boundary
- Primary Road
- Secondary Road

Public Rights of Way (PROW)

- Footpath
- Bridleway
- Byways open to all traffic
- Restricted Byway

LDĀDESIGN

PROJECT TITLE

BELVOIR SOLAR FARM

DRAWING TITLE

PRoW within Appeal Site and Immediate Context

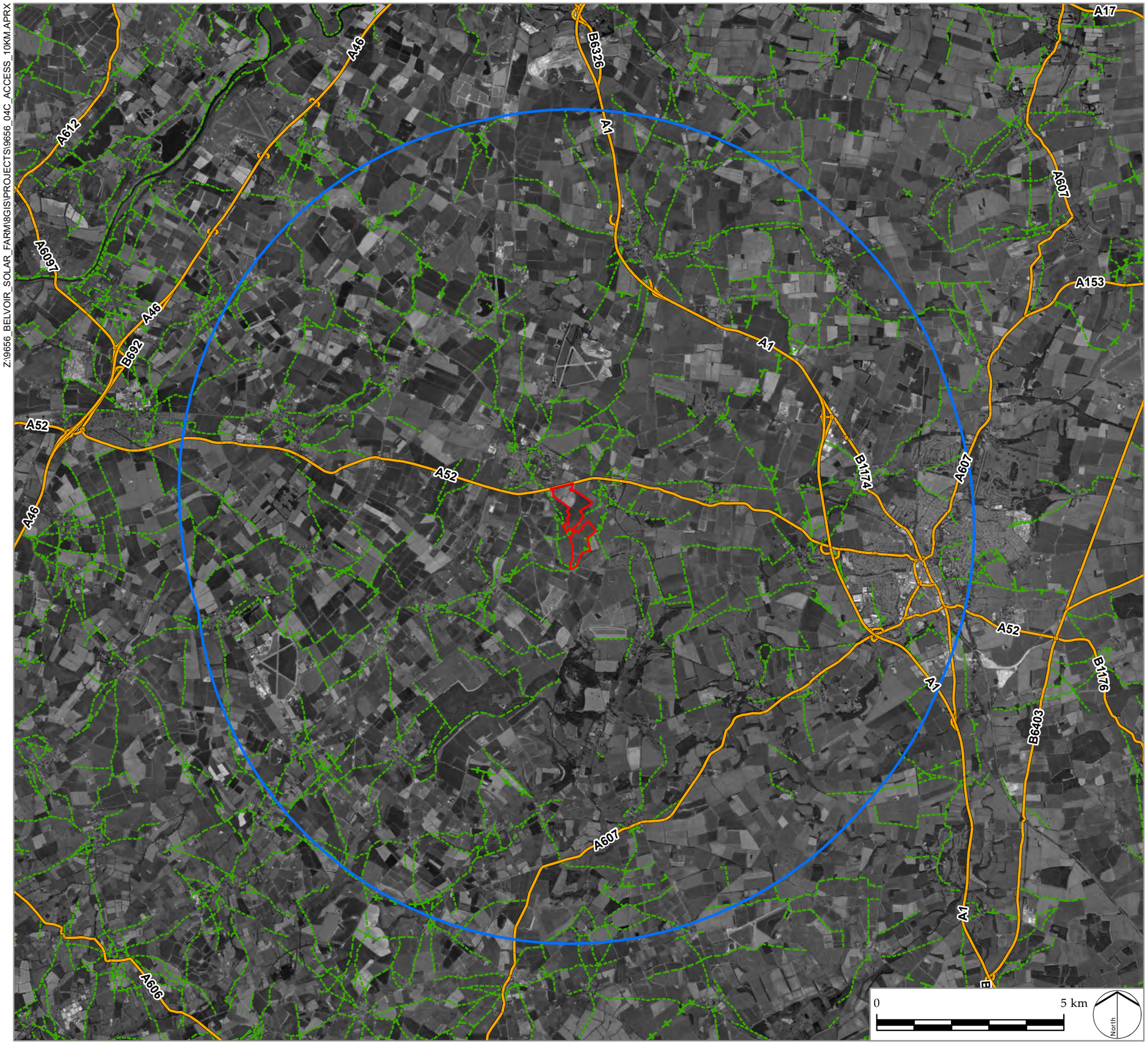
ISSUED BY	Oxford	T:	01865 887 050
DATE	July 2024	DRAWN	SMc
SCALE @A3	1:10,000	CHECKED	PL
STATUS	Final	APPROVED	PL

DWG. NO. 9656_04B

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

Sources: Ordnance Survey,

Z:\9656_BELVOIR_SOLAR_FARM\8GIS\PROJECTS\9656_04C_ACCESS_10KM.APRX



LEGEND

- Site Boundary
- Study Area (10km)
- Primary Road

Public Rights of Way (PROW)

- Footpath
- Bridleway
- Byway open to all traffic
- Restricted Byway

LDĀDESIGN

PROJECT TITLE

BELVOIR SOLAR FARM

DRAWING TITLE

PRoW within 10km Study Area

ISSUED BY	Oxford	T:	01865 887 050
DATE	July 2024	DRAWN	SMc
SCALE @A3	1:100,000	CHECKED	PL
STATUS	Final	APPROVED	PL

DWG. NO. 9656_04C

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

Sources: Ordnance Survey,

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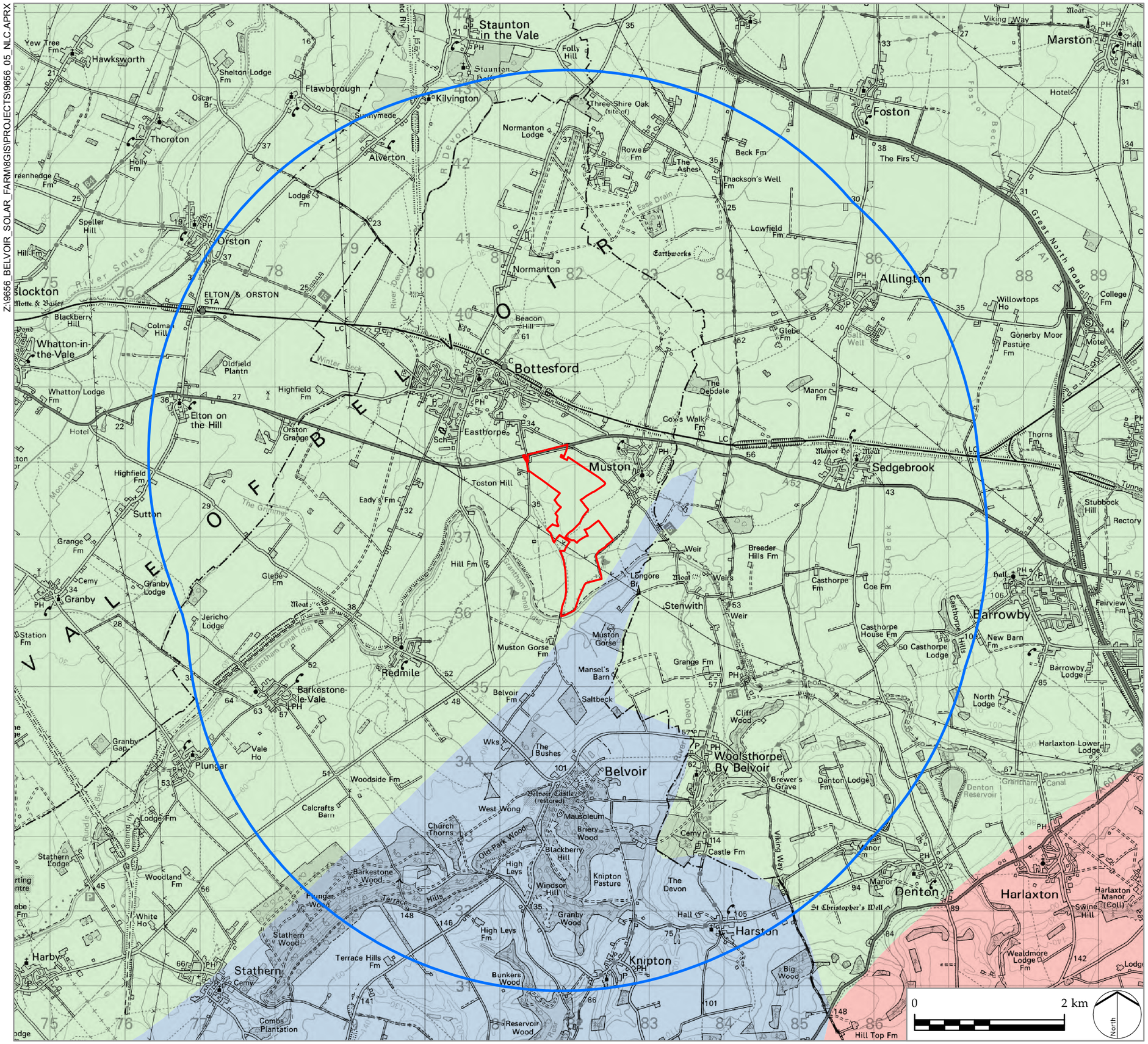

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OS Open data / © Natural England / © DEFRA / © DECC / © Historic England/ © Environment Agency. Contains Ordnance Survey data. Aerial Photography -

LEGEND

- Site Boundary
- Study Area (5km)

National Landscape Character Area

- Trent and Belvoir Vales
- Leicestershire and Nottinghamshire Wolds
- Kesteven Uplands

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PROJECT TITLE

BELVOIR SOLAR FARM

DRAWING TITLE

National Character Areas

ISSUED BY	Oxford	T:	01865 887 050
DATE	July 2024	DRAWN	SMc
SCALE @A3	1:50,000	CHECKED	PL
STATUS	Final	APPROVED	PL

DWG. NO. 9656_05

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

Sources: Ordnance Survey,

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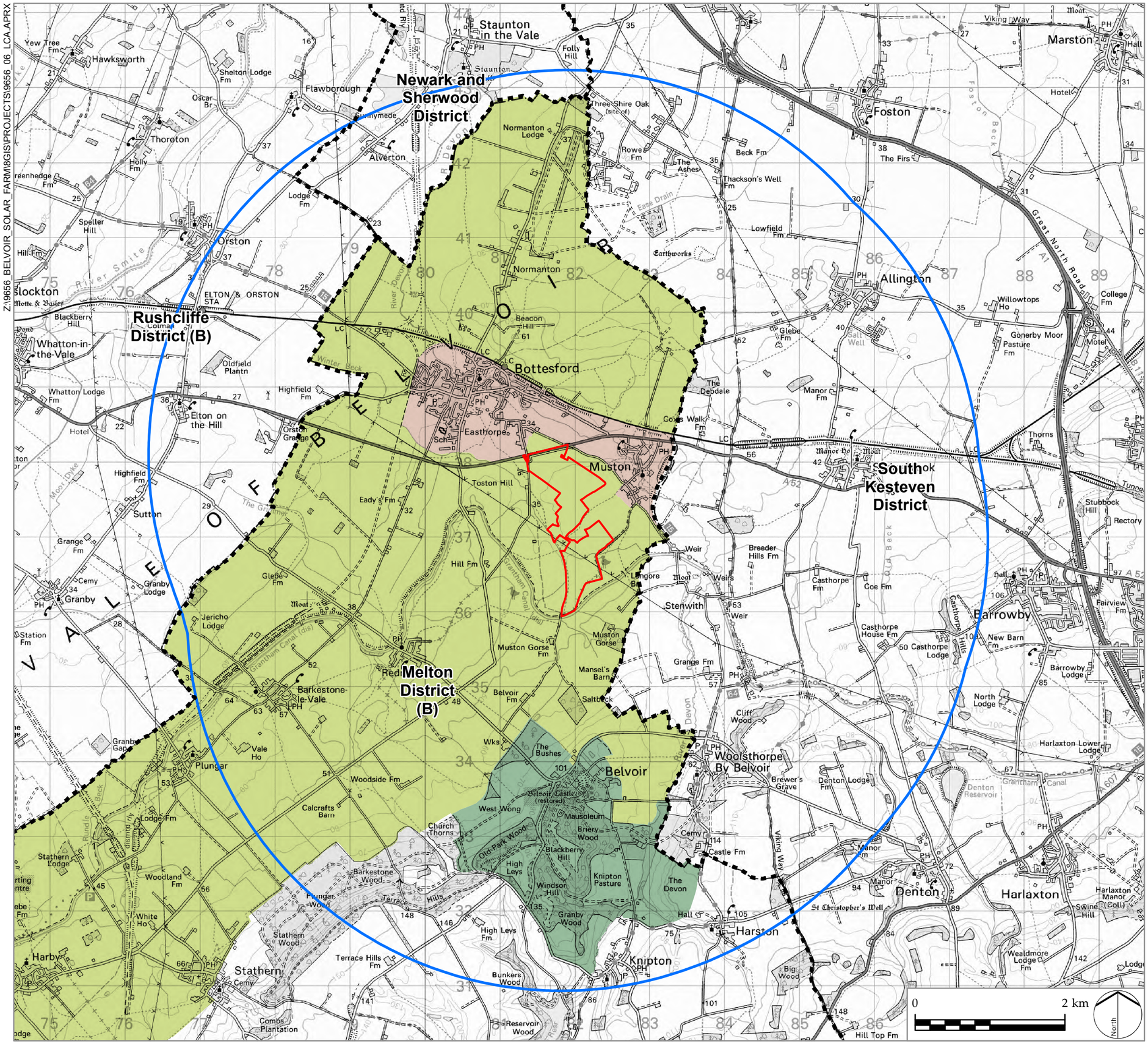

LEGEND

- Site Boundary
- Study Area (5km)
- District Boundary

Melton Landscape Character Area

- Vale of Belvoir
- Bottesford
- Parkland

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PROJECT TITLE

BELVOIR SOLAR FARM

DRAWING TITLE

Local Landscape Character Areas

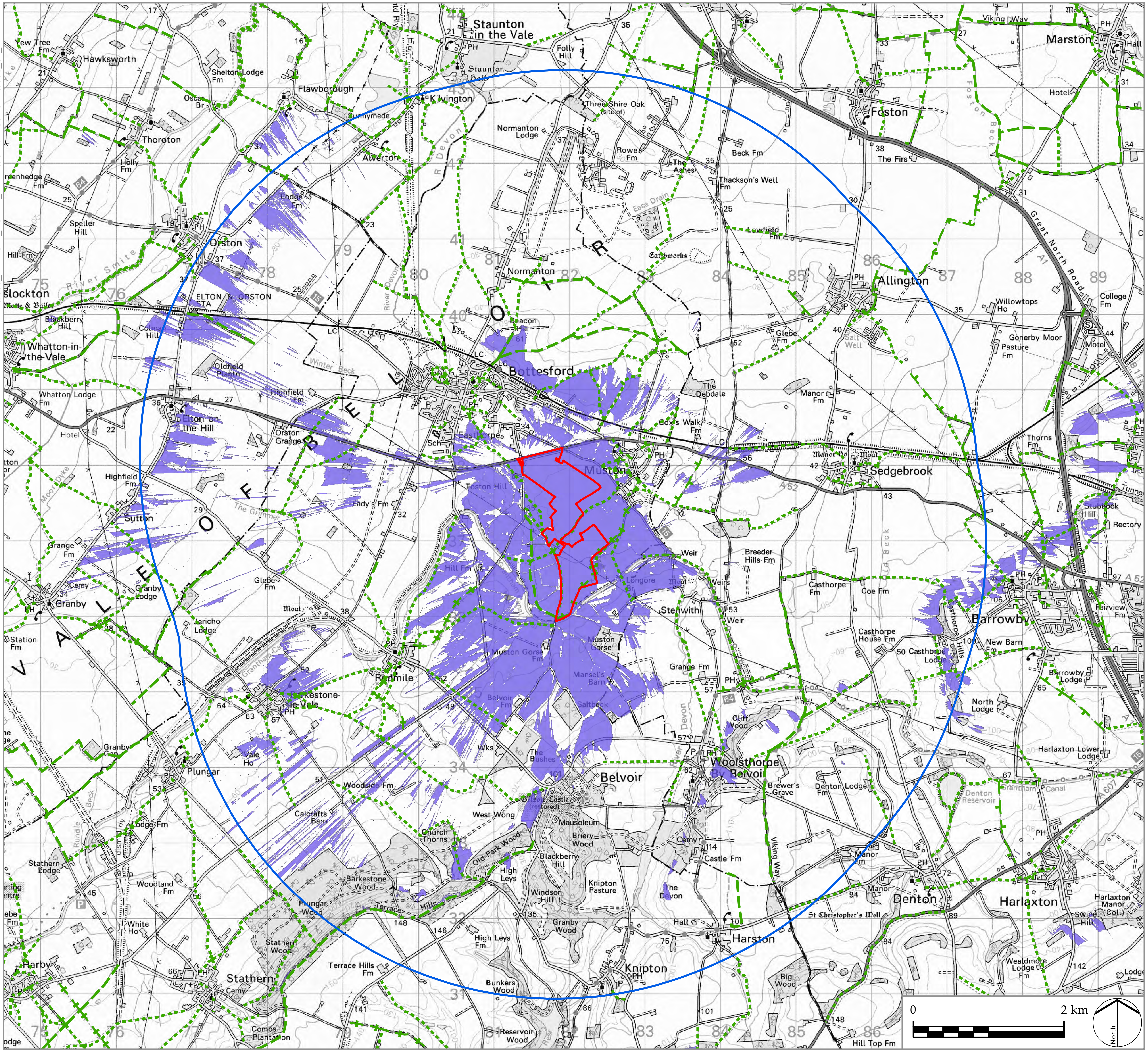
ISSUED BY	Oxford	T:	01865 887 050
DATE	July 2024	DRAWN	SMc
SCALE @A3	1:50,000	CHECKED	PL
STATUS	Final	APPROVED	PL

DWG. NO. 9656_06

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

Sources: Ordnance Survey,

Z:\9656_BELVOIR_SOLAR_FARM\8GIS\PROJECTS\9656_07_ZTV.APRX



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LEGEND

Site Boundary

Study Area (5km)

Zone of Theoretical Visibility (ZTV) (computer generated) - based on height of 3m

Public Rights of Way (PROW)

Footpath

Bridleway

Byway open to all traffic

Restricted Byway

This drawing is based upon computer generated Zone of Theoretical Visibility (ZTV) studies produced using the viewshed routine in the ESRI ArcGIS Suite. The areas shown are the maximum theoretical visibility, taking into account topography, vegetation and buildings which have been included in the model with the heights obtained from a LiDAR digital surface model.

Due to its resolution, the surface model does not take into account every localised feature such as walls, small hedgerows or small trees and therefore only gives an impression of the extent of visibility.

The ZTV includes an adjustment that allows for Earth's curvature and light refraction. It is based on LiDAR terrain data with a $1m^2$ resolution, resampled to 5m.

LDĀ DESIGN

PROJECT TITLE

BELVOIR SOLAR FARM

DRAWING TITLE

Zone of Theoretical Visibility (ZTV) Study

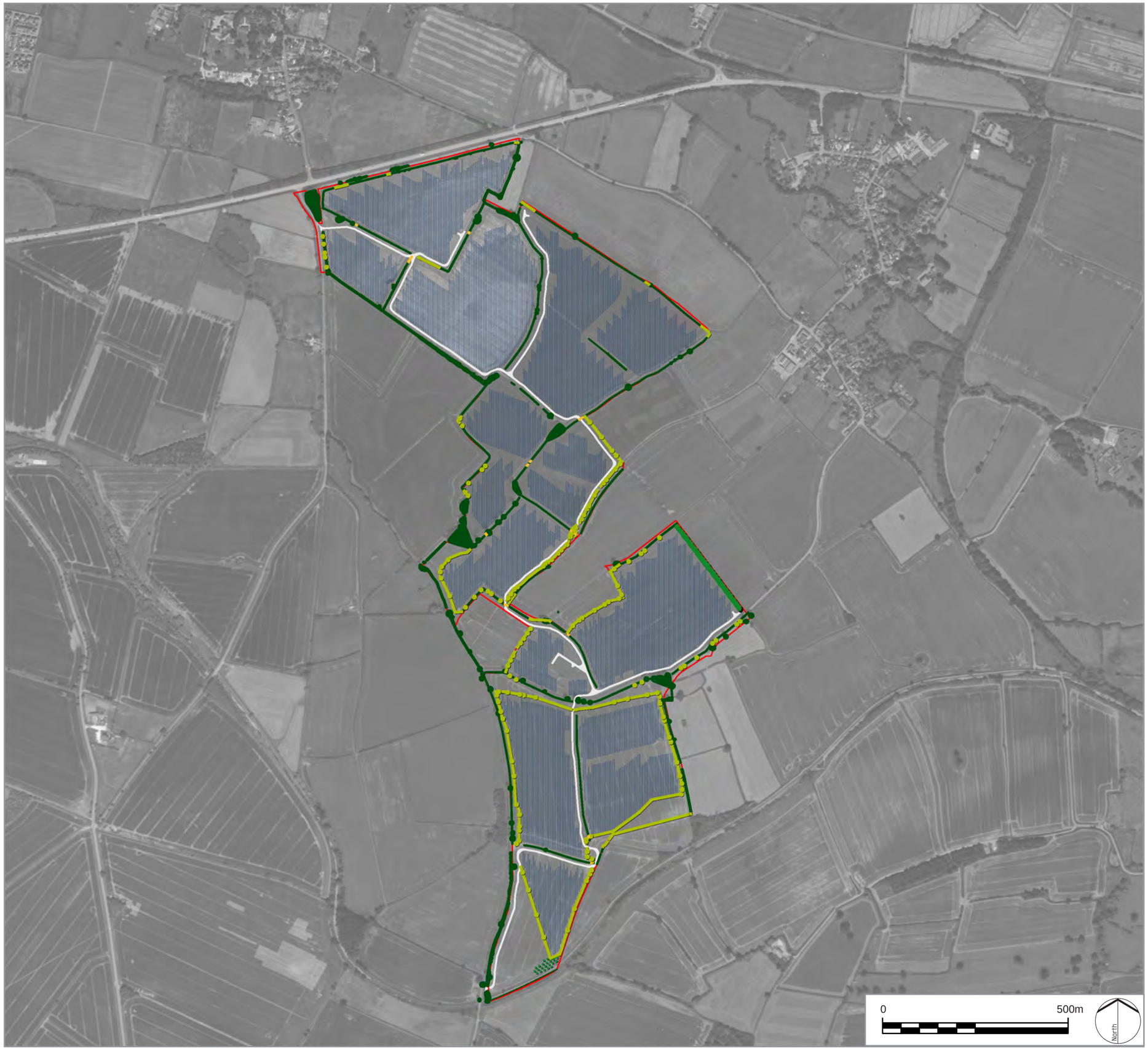
ISSUED BY	Oxford	T:	01865 887 050
DATE	June 2024	DRAWN	SG
SCALE @A3	1:50,000	CHECKED	PL
STATUS	Final	APPROVED	PL

DWG. NO. 9656_07

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

Sources: Ordnance Survey, Environment Agency

Z:\9656_Belvoir_Solar_Farm\5graphics\Plans_Images



LEGEND

- Site boundary
- Existing vegetation retained as existing
- Existing hedgerows to be removed
- Existing hedgerow retained and infill planted where necessary
- Proposed New Hedgerow Planting
- Proposed Native Tree Buffer Planting
- Proposed Orchard Tree Planting
- Proposed Native Tree Planting

LDĀDESIGN

PROJECT TITLE

BELVOIR SOLAR FARM

DRAWING TITLE

Landscape Strategy: Trees and Hedgerows

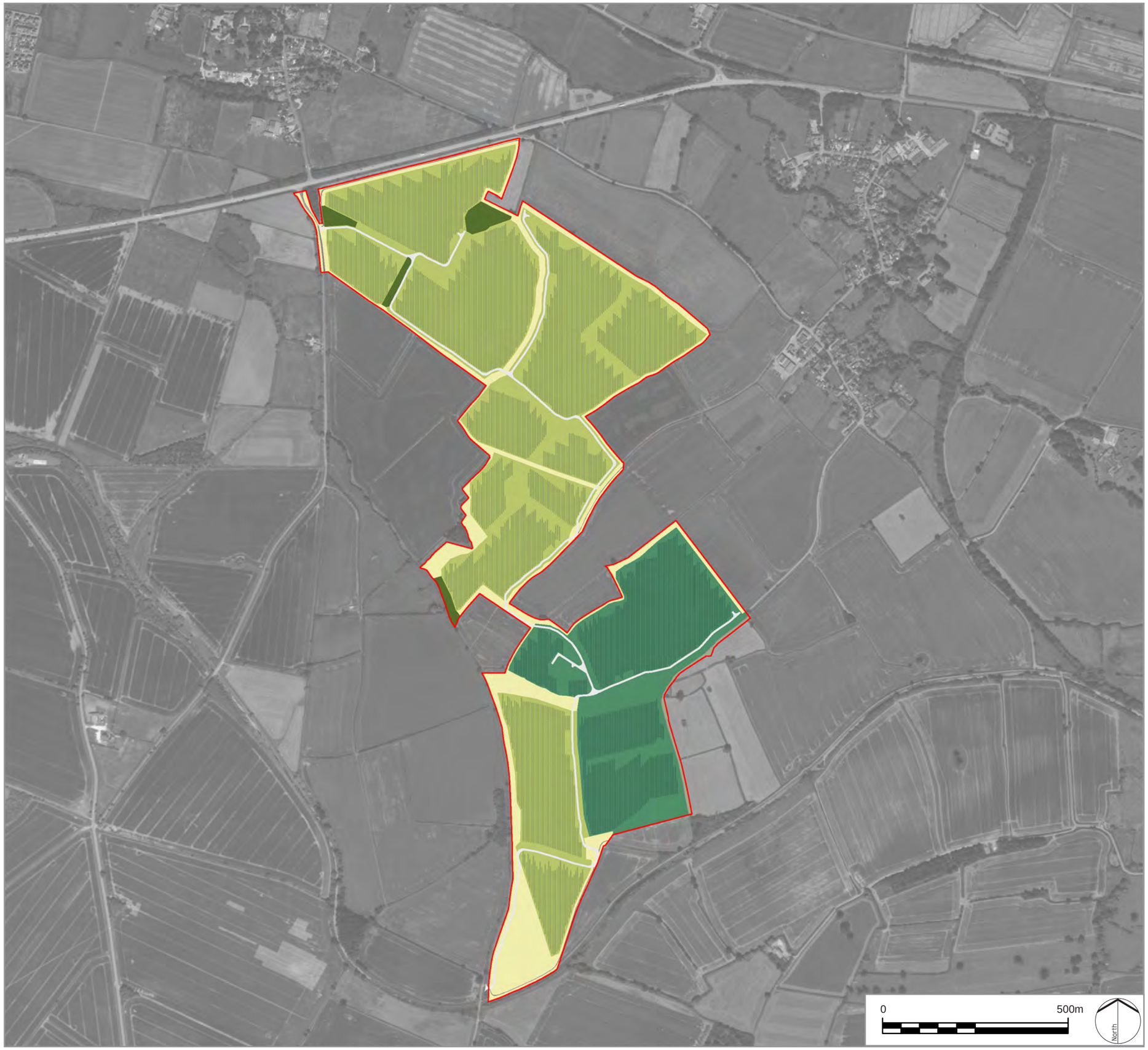
ISSUED BY	Oxford	T: 01865 887050	
DATE	July 2024	DRAWN	SMc
SCALE@A3	1:10,000	CHECKED	PL
STATUS	Final	APPROVED	PL

DWG. NO. 9656_08

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

Sources: Ordnance Survey...

Z:\9656_Belvoir_Solar_Farm\5graphics\Plans_Images



LEGEND

- Site boundary
- Grazing Seed Mix to Panel Compounds
- Meadow Seed Mix to Field Margins
- Tussocky Grass Mix
- Grassland adjacent to Muston Meadows SSSI / NNR

LDĀDESIGN

PROJECT TITLE

BELVOIR SOLAR FARM

DRAWING TITLE

Landscape Strategy: Grasslands

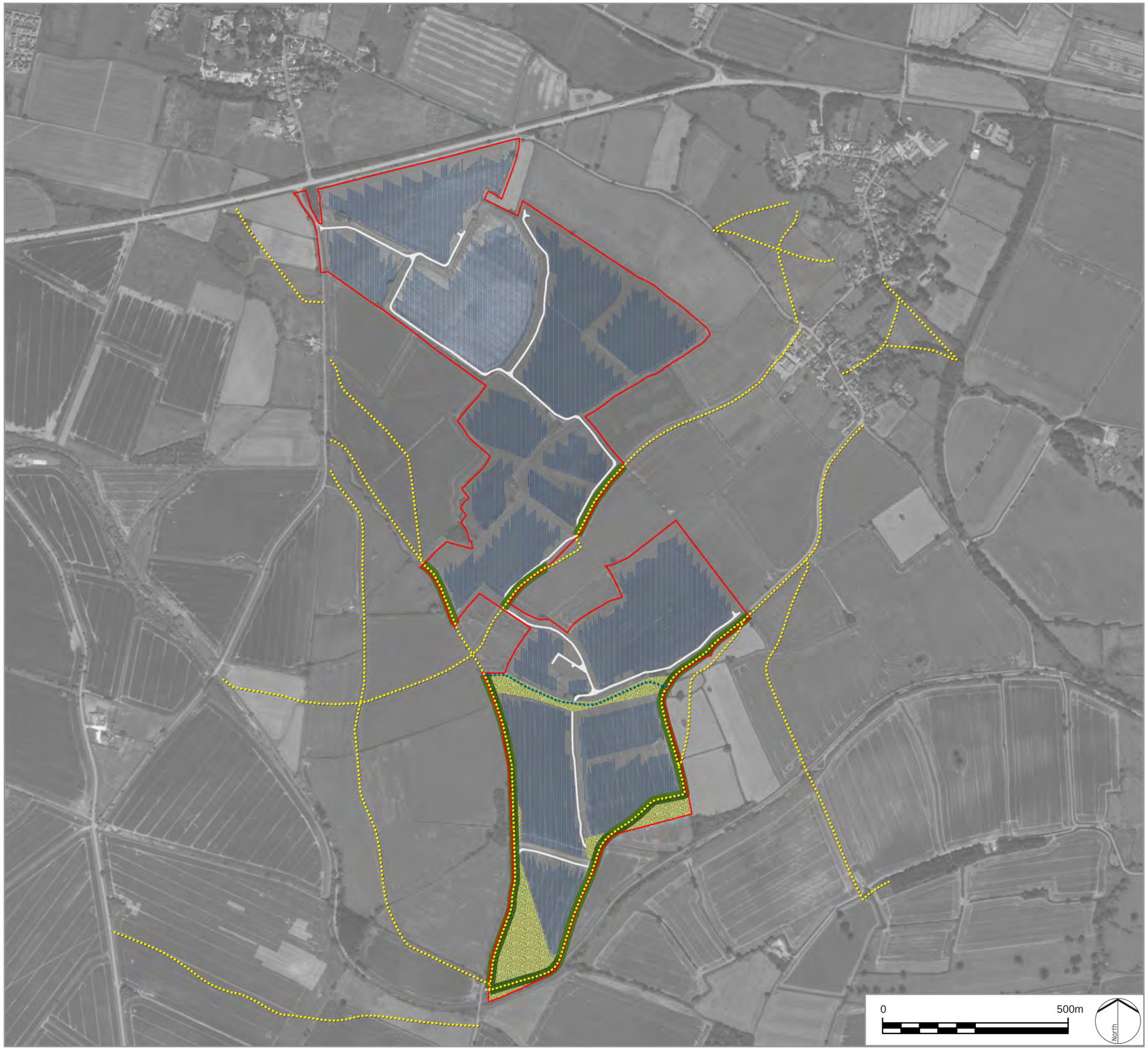
ISSUED BY	Oxford	T: 01865 887050	
DATE	July 2024	DRAWN	SMc
SCALE@A3	1:10,000	CHECKED	PL
STATUS	Final	APPROVED	PL

DWG. NO. 9656_09

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

Sources: Ordnance Survey...

Z:\9656_Belvoir_Solar_Farm\5graphics\Plans_Images



LEGEND

- Site boundary
- Public Right of Way
- Permissive footpath linking PRoW
- Public Right of Way to be set within Green Lane
- Publically accessible open spaces

LDĀDESIGN

PROJECT TITLE

BELVOIR SOLAR FARM

DRAWING TITLE

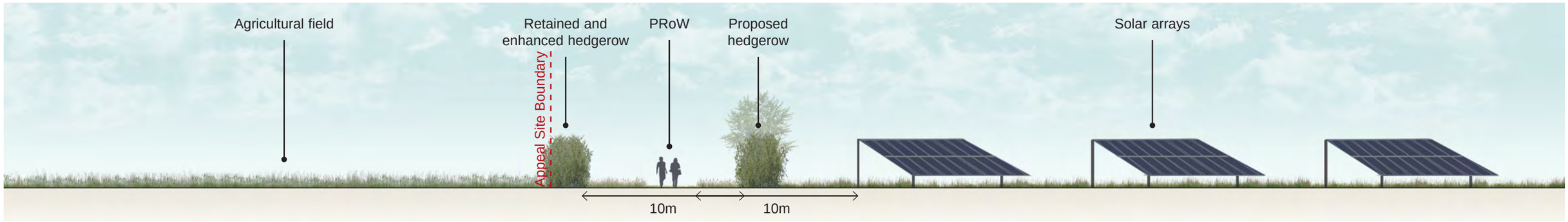
Landscape Strategy: Routes and Spaces

ISSUED BY	Oxford	T: 01865 887050	
DATE	July 2024	DRAWN	SMc
SCALE@A3	1:10,000	CHECKED	PL
STATUS	Final	APPROVED	PL

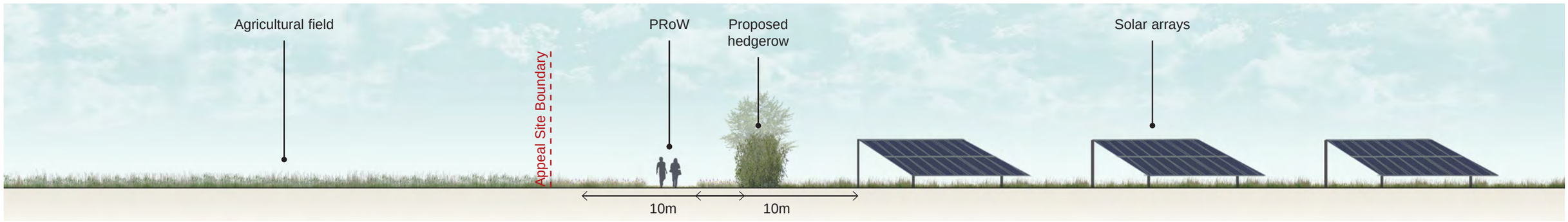
DWG. NO. 9656_10

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

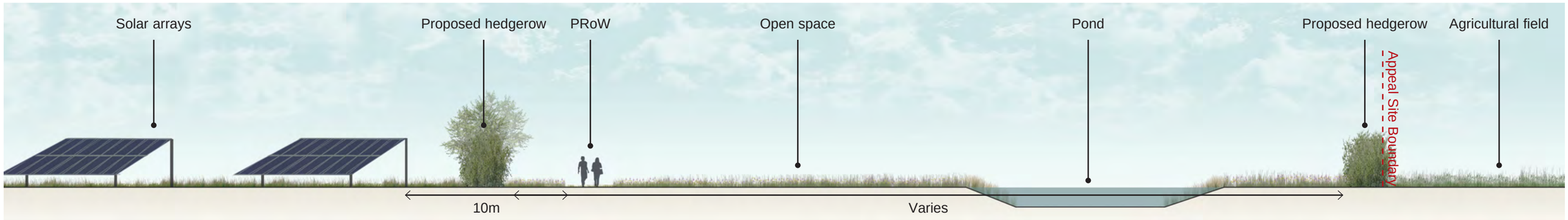
Sources: Ordnance Survey...



Illustrative Section - Green Lane circa 10m wide with hedgerow boundaries to both sides



Illustrative Section - Green Lane circa 10m wide with hedgerow boundary to solar arrays / open aspect to agricultural field



Illustrative Section - Green Lane incorporating open space and hedgerow boundaries

ISSUED BY	Oxford	t: 01865 887050	
DATE	Aug 2024	DRAWN	SMoo
PAGE SIZE	420mm x 297mm	CHECKED	PL
STATUS	Final	APPROVED	PL

DWG. NO. 9656_011

PROJECT TITLE
BELVOIR SOLAR FARM

DRAWING TITLE
Illustrative Sections

Z:\9656_BELVOIR_SOLAR_FARM\8GIS\PROJECTS\9656_11_VIEWPOINT_LOCATIONS.APRX

LEGEND

- Site Boundary
- LVIA Viewpoint Locations (Pegasus)
- LVIA Visualisations (Pegasus)
- Heritage Viewpoints (Pegasus)
- Heritage Visualisations (Pegasus)
- Post Application Visualisations (Pegasus)
- Appeal Visualisations (LDA)

LDĀDESIGN

PROJECT TITLE

BELVOIR SOLAR FARM

DRAWING TITLE

Approximate Location of Viewpoint / Visualisations

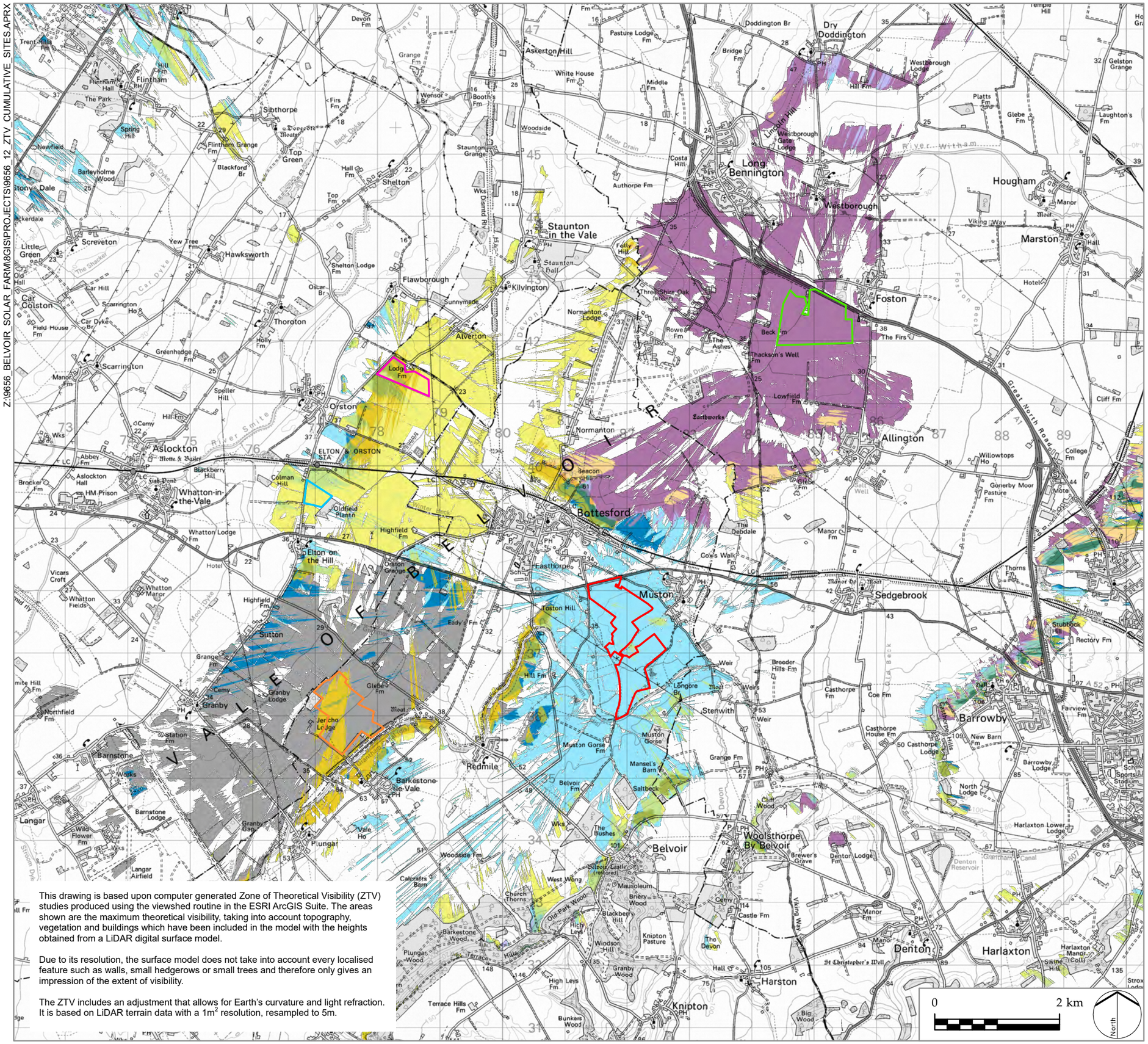
ISSUED BY	Oxford	T: 01865 887 050	
DATE	July 2024	DRAWN	SMc
SCALE @A3	1:25,000	CHECKED	PL
STATUS	Final	APPROVED	PL

DWG. NO. 9656_12

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

Sources: Ordnance Survey,

Z:\9656_BELVOIR_SOLAR_FARM\8GIS\PROJECTS\9656_12_ZTV_CUMULATIVE_SITES.APRX



This drawing is based upon computer generated Zone of Theoretical Visibility (ZTV) studies produced using the viewshed routine in the ESRI ArcGIS Suite. The areas shown are the maximum theoretical visibility, taking into account topography, vegetation and buildings which have been included in the model with the heights obtained from a LiDAR digital surface model.

Due to its resolution, the surface model does not take into account every localised feature such as walls, small hedgerows or small trees and therefore only gives an impression of the extent of visibility.

The ZTV includes an adjustment that allows for Earth's curvature and light refraction. It is based on LiDAR terrain data with a 1m^2 resolution, resampled to 5m.

LEGEND

- Site Boundary
- Elton Solar: 10MW Solar Farm, Land South of The Railway Line and East of Station Road, Elton, Nottinghamshire (Planning Ref: 14/01739/FUL Rushcliffe Borough Council). Constructed and operational.
- Lodge Farm Solar: 12.4MW Solar Farm, Lodge Farm, Longhedge Lane, Orston (Planning Ref: 13/01609/FUL Rushcliffe Borough Council). Constructed and operational.
- By-Pass Farm Solar: 49.9MW Solar Farm, Land South of the A1 (Foston Bypass), Foston, Grantham (Planning Ref: S20/1433 South Kesteven Council). Granted permission subject to conditions 1st March 2021.
- Green Farm Solar: 49.9MW Solar Farm, Land East of Jericho Covert, Jericho Lane, Barkestone Le Vale (Planning Ref: 20/01182/FUL Melton Borough Council). Validated 15th October 2020, still pending decision.

LDĀDESIGN

PROJECT TITLE

BELVOIR SOLAR FARM

DRAWING TITLE

Cumulative Zone of Theoretical Visibility (ZTV) Study

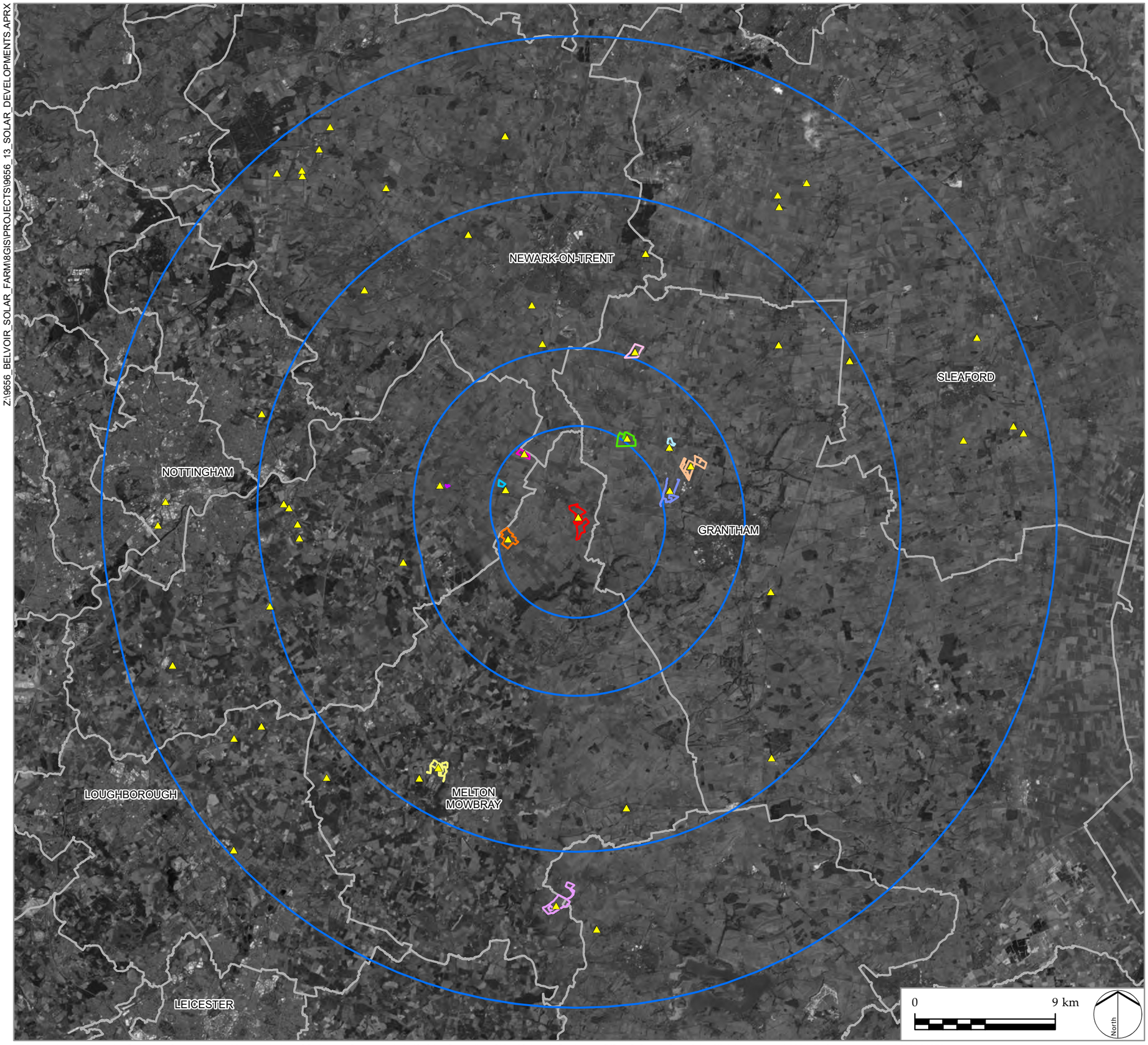
ISSUED BY	Oxford	T:	01865 887 050
DATE	June 2024	DRAWN	SG
SCALE @A3	1:60,000	CHECKED	PL
STATUS	Final	APPROVED	PL

DWG. NO. 9656_13

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

Sources: Ordnance Survey, Environment Agency

Z:\9656_BELVOIR_SOLAR_FARM\8GIS\PROJECTS\9656_13_SOLAR_DEVELOPMENTS.APRX



LEGEND

- Site Boundary
- Study Areas (5km, 10km, 20km, 30km)
- District Boundary
- Solar Schemes (Operational, Under Construction, Awaiting Construction)
- Potters Hill Solar Farm
- Lumiere Solar Farm
- Green Farm Solar: 49.9MW Solar Farm, Land East of Jericho Covert, Jericho Lane, Barkestone Le Vale (Planning Ref: 20/01182/FUL Melton Borough Council). Validated 15th October 2020, still pending decision.
- Lodge Farm Solar: 12.4MW Solar Farm, Lodge Farm, Longhedge Lane, Orston (Planning Ref: 13/01609/FUL Rushcliffe Borough Council). Constructed and operational.
- Elton Solar: 10MW Solar Farm, Land South of The Railway Line and East of Station Road, Elton, Nottinghamshire (Planning Ref: 14/01739/FUL Rushcliffe Borough Council). Constructed and operational.
- By-Pass Farm Solar: 49.9MW Solar Farm, Land South of the A1 (Foston Bypass), Foston, Grantham (Planning Ref: S20/1433 South Kesteven District Council). Granted permission subject to conditions 1st March 2021.
- Grantham Solar Farm: 5MW Solar Farm, Land South-East of Pasture Farm, Allington Lane, Allington, Grantham (Planning Ref: S15/0383 South Kesteven District Council). Constructed and operational.
- Gonerby Moor Solar: 49.9MW Solar Farm, Land at Gonerby Moor, Great Gonerby (Planning Ref: S21/1018 South Kesteven District Council). Granted permission subject to conditions 3rd November 2021).
- Marston Solar: 4.4MW Solar Farm, Land at Toll Bar Road, Marston (Planning Ref: S11/0548 South Kesteven District Council). Constructed and operational.
- HMP Whatton Solar Farm: 253kW Solar Farm, HM Prison Whatton, New Lane, Whatton (Planning Ref: 21/03114/FUL Rushcliffe Borough Council). Granted permission subject to conditions 10th February 2022.
- Copley Farm: 28MW Solar Farm, Copley Farm, Doddington Lane, Claypole, Newark (Planning Ref: S13/3273 South Kesteven District Council). Constructed and operational.

LDĀDESIGN

PROJECT TITLE

BELVOIR SOLAR FARM

DRAWING TITLE

Approximate Locations of Solar Development within 30km Study Area

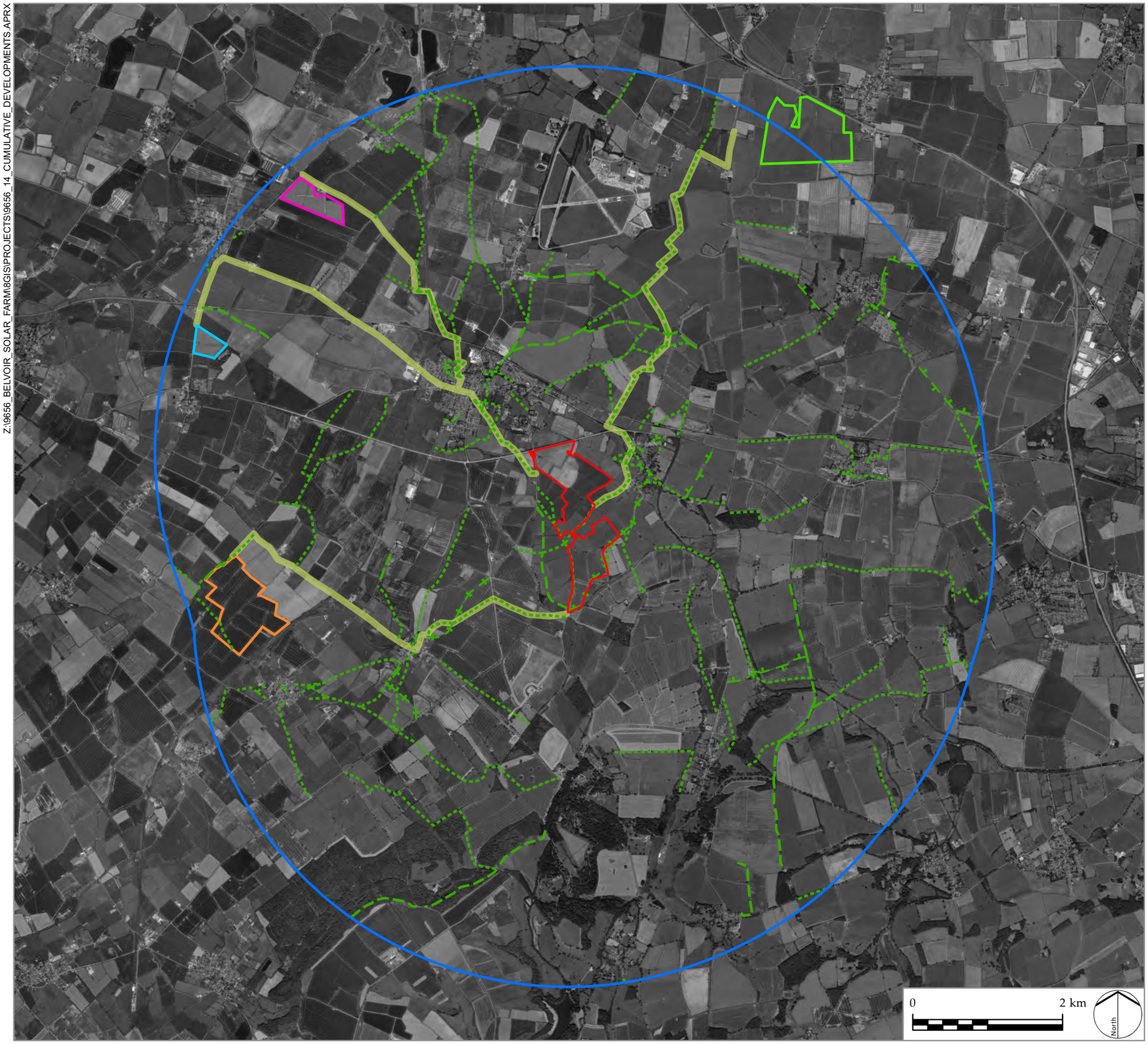
ISSUED BY	Oxford	T:	01865 887 050
DATE	July 2024	DRAWN	ARe
SCALE @A3	1:240,000	CHECKED	PL
STATUS	Final	APPROVED	PL

DWG. NO. 9656_14

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

Sources: Ordnance Survey, RWE, Department for Business, Energy & Industrial Strategy, Rushcliffe Borough Council, South Kesteven District Council, Melton Borough Council

Z:\9656_BELVOIR_SOLAR_FARM\8GIS\PROJECTS\9656_14_CUMULATIVE_DEVELOPMENTS.APRX



LEGEND

- Site Boundary
- Study Area (5km)
- Elton Solar: 10MW Solar Farm, Land South of The Railway Line and East of Station Road, Elton, Nottinghamshire (Planning Ref: 14/01739/FUL Rushcliffe Borough Council). Constructed and operational.
- Lodge Farm Solar: 12.4MW Solar Farm, Lodge Farm, Longhedge Lane, Orston (Planning Ref: 13/01609/FUL Rushcliffe Borough Council). Constructed and operational.
- By-Pass Farm Solar: 49.9MW Solar Farm, Land South of the A1 (Foston Bypass), Foston, Grantham (Planning Ref: S20/1433 South Kesteven Council). Granted permission subject to conditions 1st March 2021.
- Green Farm Solar: 49.9MW Solar Farm, Land East of Jericho Covert, Jericho Lane, Barkestone Le Vale (Planning Ref: 20/01182/FUL Melton Borough Council). Validated 15th October 2020, still pending decision.

Public Rights of Way (PROW)

- Footpath
- Bridleway
- Byways open to all traffic
- Restricted Byway
- Indicative direct walking route

LDĀDESIGN

PROJECT TITLE

BELVOIR SOLAR FARM

DRAWING TITLE

Cumulative Solar Developments, PRoW and Connecting Routes

ISSUED BY	Oxford	T:	01865 887 050
DATE	June 2024	DRAWN	SMc
SCALE @A3	1:50,000	CHECKED	PL
STATUS	Final	APPROVED	PL

DWG. NO. 9656_15

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

Sources: Ordnance Survey, Environment Agency

Appendix 2: Visualisations

Existing Photograph (Left)

LDĀDESIGN

Camera Location (OS Grid Reference):	482322 E 334354 N
Ground Level (mAOD):	90.0m
Direction of View: bearing from North (0°):	275°
Distance to Site:	1.5km

Horizontal Field of View:	90° (Planar projection)
Paper Size:	841mm x 297mm (Half A1)
Enlargement Factor:	96%
Visualisation Type:	Type 1 (for context)

Photo Date / Time:	15/07/2024 11:04
Camera Model and Sensor Format:	Canon EOS 6D, FFS
Lens Make, Model and Focal Length:	Canon EF50mm f/1.8 STM
Height of Camera Lens above Ground (mAOD):	1.5m

PROJECT TITLE
BELVOIR SOLAR FARM

DRAWING TITLE
Viewpoint 9 - View from Jubilee Way, looking north
Existing Photograph

FIGURE 9656_PM_09 DATE 08/08/2024 Sheet 1 of 6

Z:\9656_BELVOIR_SOLAR_FARM\6DOCS\VISUALS\9656_PM_09.INDD

Existing Photograph (Centre)

LDĀDESIGN	Camera Location (OS Grid Reference):	482322 E 334354 N	Horizontal Field of View:	90° (Planar projection)	Photo Date / Time:	15/07/2024 11:04	
	Ground Level (mAOD):	90.0m	Paper Size:	841mm x 297mm (Half A1)	Camera Model and Sensor Format:	Canon EOS 6D, FFS	
	Direction of View: bearing from North (0°):	5°	Enlargement Factor:	96%	Lens Make, Model and Focal Length:	Canon EF50mm f/1.8 STM	
	Distance to Site:	1.5km	Visualisation Type:	Type 1 (for context)	Height of Camera Lens above Ground (mAOD):	1.5m	

PROJECT TITLE
BELVOIR SOLAR FARM

DRAWING TITLE
Viewpoint 9 - View from Jubilee Way, looking north
Existing Photograph

FIGURE 9656_PM_09 DATE 08/08/2024 Sheet 2 of 6

LDĀDESIGN

Camera Location (OS Grid Reference):	482322 E 334354 N
Ground Level (mAOD):	90.0m
Direction of View: bearing from North (0°):	95°
Distance to Site:	1.5km

Horizontal Field of View:	90° (Planar projection)
Paper Size:	841mm x 297mm (Half A1)
Enlargement Factor:	96%
Visualisation Type:	Type 1 (for context)

Photo Date / Time:	15/07/2024 11:04
Camera Model and Sensor Format:	Canon EOS 6D, FFS
Lens Make, Model and Focal Length:	Canon EF50mm f/1.8 STM
Height of Camera Lens above Ground (mAOD):	1.5m

PROJECT TITLE
BELVOIR SOLAR FARM

DRAWING TITLE
Viewpoint 9 - View from Jubilee Way, looking north
Existing Photograph

FIGURE 9656_PM_09 DATE 08/08/2024 Sheet 3 of 6

LDĀDESIGN

Camera Location (OS Grid Reference):	482322 E 334354 N
Ground Level (mAOD):	90.0m
Direction of View: bearing from North (0°):	275°
Distance to Site:	1.5km

Horizontal Field of View:	90° (Planar projection)
Paper Size:	841mm x 297mm (Half A1)
Enlargement Factor:	96%
Visualisation Type:	Type 3

Photo Date / Time:	15/07/2024 11:04
Camera Model and Sensor Format:	Canon EOS 6D, FFS
Lens Make, Model and Focal Length:	Canon EF50mm f/1.8 STM
Height of Camera Lens above Ground (mAOD):	1.5m

This wireframe is based upon LiDAR digital terrain data with spot heights at 2m (which does not precisely model small scale changes in landform or sharp breaks in slope).

The three dimensional model of the development is based on the proposed layout.

PROJECT TITLE
BELVOIR SOLAR FARM

DRAWING TITLE
Viewpoint 9 - View from Jubilee Way, looking north
Wireline

FIGURE 9656_PM_09 DATE 08/08/2024

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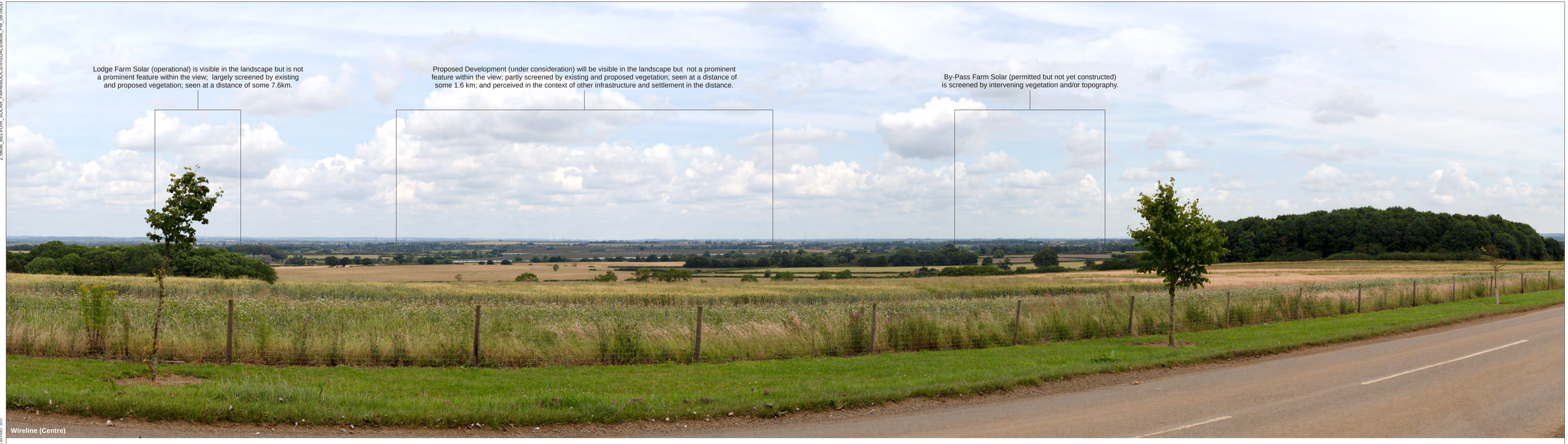

LDĀDESIGN

Camera Location (OS Grid Reference):	482322 E 334354 N
Ground Level (mAOD):	90.0m
Direction of View: bearing from North (0°):	5°
Distance to Site:	1.5km

Horizontal Field of View:	90° (Planar projection)
Paper Size:	841mm x 297mm (Half A1)
Enlargement Factor:	96%
Visualisation Type:	Type 3

Photo Date / Time:	15/07/2024 11:04
Camera Model and Sensor Format:	Canon EOS 6D, FFS
Lens Make, Model and Focal Length:	Canon EF50mm f/1.8 STM
Height of Camera Lens above Ground (mAOD):	1.5m

This wireframe is based upon LiDAR digital terrain data with spot heights at 2m (which does not precisely model small scale changes in landform or sharp breaks in slope).

The three dimensional model of the development is based on the proposed layout.

PROJECT TITLE
BELVOIR SOLAR FARM

DRAWING TITLE
Viewpoint 9 - View from Jubilee Way, looking north Wireline

FIGURE 9656_PM_09 DATE 08/08/2024 Sheet 5 of 6

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LDĀDESIGN

Camera Location (OS Grid Reference):	482322 E 334354 N
Ground Level (mAOD):	90.0m
Direction of View: bearing from North (0°):	95°
Distance to Site:	1.5km

Horizontal Field of View:	90° (Planar projection)
Paper Size:	841mm x 297mm (Half A1)
Enlargement Factor:	96%
Visualisation Type:	Type 3

Photo Date / Time:	15/07/2024 11:04
Camera Model and Sensor Format:	Canon EOS 6D, FFS
Lens Make, Model and Focal Length:	Canon EF50mm f/1.8 STM
Height of Camera Lens above Ground (mAOD):	1.5m

This wireframe is based upon LiDAR digital terrain data with spot heights at 2m (which does not precisely model small scale changes in landform or sharp breaks in slope).

The three dimensional model of the development is based on the proposed layout.

PROJECT TITLE
BELVOIR SOLAR FARM

DRAWING TITLE
Viewpoint 9 - View from Jubilee Way, looking north
Wireline

FIGURE 9656_PM_09 DATE 08/08/2024 Sheet 6 of 6

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LDĀDESIGN

Camera Location (OS Grid Reference):	481200 E 339656 N
Ground Level (mAOD):	61.2m
Direction of View: bearing from North (0°):	82°
Distance to Site:	1.7km

Horizontal Field of View:	90° (Planar projection)
Paper Size:	841mm x 297mm (Half A1)
Enlargement Factor:	96%
Visualisation Type:	Type 1 (for context)

Photo Date / Time:	15/07/2024 10:08
Camera Model and Sensor Format:	Canon EOS 6D, FFS
Lens Make, Model and Focal Length:	Canon EF50mm f/1.8 STM
Height of Camera Lens above Ground (mAOD):	1.5m

PROJECT TITLE
BELVOIR SOLAR FARM

DRAWING TITLE
Viewpoint 15 - View from Bridleway F86a/2, Beacon Hill, looking south east - Existing Photograph

FIGURE 9656_PM_15 DATE 08/08/2024 Sheet 1 of 8

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LDĀDESIGN

Camera Location (OS Grid Reference):	481200 E 339656 N
Ground Level (mAOD):	61.2m
Direction of View: bearing from North (0°):	172°
Distance to Site:	1.7km

Horizontal Field of View:	90° (Planar projection)
Paper Size:	841mm x 297mm (Half A1)
Enlargement Factor:	96%
Visualisation Type:	Type 1 (for context)

Photo Date / Time:	15/07/2024 10:08
Camera Model and Sensor Format:	Canon EOS 6D, FFS
Lens Make, Model and Focal Length:	Canon EF50mm f/1.8 STM
Height of Camera Lens above Ground (mAOD):	1.5m

PROJECT TITLE
BELVOIR SOLAR FARM

DRAWING TITLE
Viewpoint 15 - View from Bridleway F86a/2, Beacon Hill, looking south east - Existing Photograph

FIGURE 9656_PM_15 DATE 08/08/2024 Sheet 2 of 8

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LDĀDESIGN

Camera Location (OS Grid Reference):	481200 E 339656 N
Ground Level (mAOD):	61.2m
Direction of View: bearing from North (0°):	262°
Distance to Site:	1.7km

Horizontal Field of View:	90° (Planar projection)
Paper Size:	841mm x 297mm (Half A1)
Enlargement Factor:	96%
Visualisation Type:	Type 1 (for context)

Photo Date / Time:	15/07/2024 10:08
Camera Model and Sensor Format:	Canon EOS 6D, FFS
Lens Make, Model and Focal Length:	Canon EF50mm f/1.8 STM
Height of Camera Lens above Ground (mAOD):	1.5m

PROJECT TITLE
BELVOIR SOLAR FARM

DRAWING TITLE
Viewpoint 15 - View from Bridleway F86a/2, Beacon Hill, looking south east - Existing Photograph

FIGURE 9656_PM_15 DATE 08/08/2024 Sheet 3 of 8

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LDĀDESIGN

Camera Location (OS Grid Reference):	481200 E 339656 N
Ground Level (mAOD):	61.2m
Direction of View: bearing from North (0°):	352°
Distance to Site:	1.7km

Horizontal Field of View:	90° (Planar projection)
Paper Size:	841mm x 297mm (Half A1)
Enlargement Factor:	96%
Visualisation Type:	Type 1 (for context)

Photo Date / Time:	15/07/2024 10:08
Camera Model and Sensor Format:	Canon EOS 6D, FFS
Lens Make, Model and Focal Length:	Canon EF50mm f/1.8 STM
Height of Camera Lens above Ground (mAOD):	1.5m

PROJECT TITLE
BELVOIR SOLAR FARM

DRAWING TITLE
Viewpoint 15 - View from Bridleway F86a/2, Beacon Hill, looking south east - Existing Photograph

FIGURE 9656_PM_15 DATE 08/08/2024 Sheet 4 of 8

LDĀDESIGN

Camera Location (OS Grid Reference):	481200 E 339656 N
Ground Level (mAOD):	61.2m
Direction of View: bearing from North (0°):	82°
Distance to Site:	1.7km

Horizontal Field of View:	90° (Planar projection)
Paper Size:	841mm x 297mm (Half A1)
Enlargement Factor:	96%
Visualisation Type:	Type 3

Photo Date / Time:	15/07/2024 10:08
Camera Model and Sensor Format:	Canon EOS 6D, FFS
Lens Make, Model and Focal Length:	Canon EF50mm f/1.8 STM
Height of Camera Lens above Ground (mAOD):	1.5m

This wireframe is based upon LiDAR digital terrain data with spot heights at 2m (which does not precisely model small scale changes in landform or sharp breaks in slope).

The three dimensional model of the development is based on the proposed layout.

PROJECT TITLE
BELVOIR SOLAR FARM

DRAWING TITLE
Viewpoint 15 - View from Bridleway F86a/2, Beacon Hill, looking south east - Wireline

FIGURE 9656_PM_15 DATE 08/08/2024 Sheet 5 of 8

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LDĀDESIGN

Camera Location (OS Grid Reference):	481200 E 339656 N
Ground Level (mAOD):	61.2m
Direction of View: bearing from North (0°):	172°
Distance to Site:	1.7km

Horizontal Field of View:	90° (Planar projection)
Paper Size:	841mm x 297mm (Half A1)
Enlargement Factor:	96%
Visualisation Type:	Type 3

Photo Date / Time:	15/07/2024 10:08
Camera Model and Sensor Format:	Canon EOS 6D, FFS
Lens Make, Model and Focal Length:	Canon EF50mm f/1.8 STM
Height of Camera Lens above Ground (mAOD):	1.5m

This wireframe is based upon LiDAR digital terrain data with spot heights at 2m (which does not precisely model small scale changes in landform or sharp breaks in slope).

The three dimensional model of the development is based on the proposed layout.

PROJECT TITLE
BELVOIR SOLAR FARM

DRAWING TITLE
Viewpoint 15 - View from Bridleway F86a/2, Beacon Hill, looking south east - Wireline

FIGURE 9656_PM_15 DATE 08/08/2024 Sheet 6 of 8

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LDĀDESIGN

Camera Location (OS Grid Reference):	481200 E 339656 N
Ground Level (mAOD):	61.2m
Direction of View: bearing from North (0°):	262°
Distance to Site:	1.7km

Horizontal Field of View:	90° (Planar projection)
Paper Size:	841mm x 297mm (Half A1)
Enlargement Factor:	96%
Visualisation Type:	Type 3

Photo Date / Time:	15/07/2024 10:08
Camera Model and Sensor Format:	Canon EOS 6D, FFS
Lens Make, Model and Focal Length:	Canon EF50mm f/1.8 STM
Height of Camera Lens above Ground (mAOD):	1.5m

This wireframe is based upon LiDAR digital terrain data with spot heights at 2m (which does not precisely model small scale changes in landform or sharp breaks in slope).

The three dimensional model of the development is based on the proposed layout.

PROJECT TITLE
BELVOIR SOLAR FARM

DRAWING TITLE
Viewpoint 15 - View from Bridleway F86a/2, Beacon Hill, looking south east - Wireline

FIGURE 9656_PM_15 DATE 08/08/2024 Sheet 7 of 8

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LDĀDESIGN	Camera Location (OS Grid Reference):	481200 E 339656 N	Horizontal Field of View:	90° (Planar projection)	Photo Date / Time:	15/07/2024 10:08	This wireframe is based upon LiDAR digital terrain data with spot heights at 2m (which does not precisely model small scale changes in landform or sharp breaks in slope). The three dimensional model of the development is based on the proposed layout.		COPYRIGHT Ordnance Survey material by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown Copyright. All rights reserved. 2024 Reference number 0100031673.	PROJECT TITLE BELVOIR SOLAR FARM	DRAWING TITLE Viewpoint 15 - View from Bridleway F86a/2, Beacon Hill, looking south east - Wireline FIGURE 9656_PM_15 DATE 08/08/2024 Sheet 8 of 8
	Ground Level (mAOD):	61.2m	Paper Size:	841mm x 297mm (Half A1)	Camera Model and Sensor Format:	Canon EOS 6D, FFS					
	Direction of View: bearing from North (0°):	352°	Enlargement Factor:	96%	Lens Make, Model and Focal Length:	Canon EF50mm f/1.8 STM					
	Distance to Site:	1.7km	Visualisation Type:	Type 3	Height of Camera Lens above Ground (mAOD):	1.5m					

Appendix 3: Summary LVIA

Consultant	Receptor	Sensitivity (Susceptibility x Value)	Scale	Extent	Duration	Magnitude	Significance	Beneficial / Neutral / Adverse	Commentary
Landscape Character (Operational Phase)									
Landscape Character: LCA 1 – Vale of Belvoir									
Pegasus	Year 1	**Medium** *(medium susceptibility x medium value)*	-	Local	Long – term	Medium	**Moderate** *Not significant*	Adverse	At year 1 infill and new planting will begin to enhance tree cover and field pattern, having more of a beneficial impact at year 15 once it has begun to mature and management of existing hedgerows has allowed for a higher level of growth, adding to the 'strong field pattern' of the LCA. The change from low managed hedgerow to a higher height would potentially have an adverse effect within the Vale of Belvoir LCA, due to increased enclosure within a relatively open landscape.
	Year 15		-			Low	**Minor** *Not significant*	Adverse	
LDA	The Appeal Site and its immediate Context Year 1 and Year 15	**Medium** *(medium-high susceptibility x community value)*	Large	Localised	Permanent	High-medium	**Moderate** *Not significant*	Adverse	The greatest impacts on this LCA will be experienced in the Site and its immediate surroundings. Within a radius of approximately 0.5 to 1km, existing landscape features begin to restrict visibility. To the east and west, the surrounding landforms limit visibility in these directions. To the north and south, various intervening elements, such as undulating terrain and established vegetation within the field network limits views. Beyond 1km from the Appeal Site / within the study area there would be limited intervisibility with the Proposed Development and little discernible change to landscape character and key characteristics.
	Within 1km of the Appeal Site Year 1		Medium	Localised	Medium to long-term	Medium	**Moderate** *Not significant*	Adverse	
	Within 1km of the Appeal Site Year 15		Medium-small	Localised	Permanent	Medium-low	**Moderate-slight** *Not significant*	Adverse	
	Beyond 1km of the Appeal Site / within study area Year 1 and Year 15		Negligible	-	-	-	**Minimal** *Not significant*	Neutral	
Landscape Character: LCA 2 – Bottesford									
Pegasus	Year 1	**Medium** *(medium susceptibility x medium value)*	-	Local	Long – term	Medium	**Moderate** *Not significant*	Adverse	The presence of a solar development at year 1 may appear to extend the nucleated townscape within the vale landscape, this may cause a medium magnitude of change, reducing to low by year 15 when mitigation measures are in place.
	Year 15		-			Low	**Minor** *Not significant*	Adverse	
LDA	Within 500m of the Appeal Site Year 1	**Medium** *(medium susceptibility x community value)*	Medium	Limited	Medium to long-term	Medum	**Moderate** *Not significant*	Adverse	The greatest impacts on this LCA will be experienced in the Site's local context, up to approximately 500m where there would be intervisibility with the Proposed Development and changes to the setting of Munston. Beyond 500m of the Appeal Site there would be extremely limited intervisibility with the Proposed Development, in part as a consequence of the built-up area - and little discernible change to landscape character and key characteristics.
	Within 500m of the Appeal Site Year 15		Small	Limited	Permanent	Low	**Slight** *Not significant*	Adverse	
	Beyond 500m of the Appeal Site / within study area		Negligible	-	-	Negligible	**Minimal** *Not significant*	Neutral	
Landscape Character: LCA 3 – Parkland									
Pegasus	Year 1	**High**	-	Local	Long – term	Negligible	**Negligible** *Not significant*	Neutral	The site and surrounding landscape are very much of the character of the Vale of Belvoir and Bottesford landscapes. There would be no direct

	Year 15	*(high susceptibility x high value)*	-			Negligible	**Negligible** *Not significant*	Neutral	effect on the parkland landscape resulting in a negligible magnitude of change.
LDA	Entire LCA Year 1 and Year 15	**Medium** *(Medium susceptibility x Local Value)*	Negligible	-	-	**Negligible**	**Minimal** *Not significant*	Neutral	There would be little to no intervisibility with the Proposed Development from the majority of this LCA; if visible, it would be perceived at distance and not a prominent or easily distinguishable feature within the landscape; in the context of other infrastructure and settlement in the landscape; and would not alter any of the distinctive characteristics of the parkland and/or its relationship to the vale landscape.

Visual Effects (Operational Phase)									
Appeal Site and its Immediate Context									
Pegasus	**VP2: Footpath F82/3** Year 1	**High** *(high susceptibility x medium value)*	-	-	-	**High**	**Major** *Significant*	Adverse	The panels would sit below the skyline. Allowing the existing hedgerows to grow up (maximum 3m) and enhancing with infill planting would provide some level of screening between the Proposed Development and the footpath. With the above measures in place the amount of the Proposed Development visible would be reduced at year 15, however the character of the views experience would be changed from open and long ranging.
	VP2: Footpath F82/3 Year 15					**Low**	**Moderate** *Not Significant*	Adverse	
	VP3: Byway F85b/4 Year 1	**High** *(high susceptibility x medium value)*	-			**Medium**	**Major** *Significant*	Adverse	The completed Proposed Development within the Site would be visible between and above the existing low, gappy hedgerows. The Proposed Development would sit below the skyline which rises around Belvoir. Allowing the existing hedgerows along the eastern edge to grow up (maximum 3m) and enhancing with infill planting would provide some level of screening. The immediate field to the west will be screened by a belt of native tree planting by year 15. With the above measures in place the amount of the Proposed Development visible would be reduced at year 15.
	VP3: Byway F85b/4 Year 15		-	-	-	**Low**	**Moderate** *Not Significant*	Adverse	
	VP4: Byway F85b/2 Year 1	**High** *(high susceptibility x medium value)*	-	-	-	**High**	**Major** *Significant*	Adverse	The completed Proposed Development within the immediate field would be clearly visible due to the proximity of the view. Allowing the existing hedgerows to grow up (maximum 3m) and enhancing with infill planting where needed would provide a good level of screening between the Proposed Development and the byway. Occasional trees would be in-keeping with the existing trees along the southern side of the byway. With the above measures in place the amount of the Proposed Development visible would be significantly reduced at year 15.
	VP4: Byway F85b/2 Year 15		-	-	-	**Low**	**Moderate** *Not Significant*	Adverse	
	VP5: Byway F85b/1 Year 1	**High** *(high susceptibility x medium value)*	-	-	-	**High**	**Major** *Significant*	Adverse	The completed Proposed Development within the southern fields of the Site would be visible. An area of ecological enhancement will be located along this section of PRoW offsetting the Proposed Development form the byway. A hedgerow is proposed along the southern edge of the panels along the northern edge of the ecological area. With the above measures in place the amount of the Proposed Development visible would be significantly reduced at year 15.
	VP5: Byway F85b/1 Year 15		-	-	-	**Low**	**Moderate** *Not Significant*	Adverse	
	VP12: Footpath F74/1 Year 1	**High** *(high susceptibility x medium value)*	-	-	-	**Medium**	**Major** *Significant*	Adverse	There would be a partial view of the completed Proposed Development within the western fields of the Site. Allowing the existing hedgerows to grow up (maximum 3m) would provide some level of screening between the Proposed Development and the edge of Muston. With the above measures in place the amount of the Proposed Development visible in the context of the wider view would be small at year 15.
	VP12: Footpath F74/1 Year 15		-	-	-	**Low**	**Moderate** *Not Significant*	Adverse	
LDA	**VRG1: Appeal Site and its Immediate Context** Year 1	**High – Medium** *(high susceptibility x community value)*	Large	Localised	Medium to long–term	**High-medium**	**Major-Moderate** *Significant*	Adverse	There will generally be large scale effects on the views from local roads and PRoW within the localised area of the Appeal Site and its immediate context as a result of the introduction of new structures into

	VRG1: Appeal Site and its Immediate Context Year 15		Medium	Localised	Permanent	**Medium**	**Moderate** *Not Significant*	Adverse	the landscape and some curtailing of views – across the countryside – from those PRoW that adjoin the Appeal Site boundary. The proposed landscape strategy would be beneficial, with 2m high hedgerows partly (but not fully) screening the Proposed Development and bringing about associated visual amenity benefits resulting from enhanced existing and new trees, hedgerows and grassland planting. I accept that new hedgerows will enclose views to a certain degree, but the layout is such that no footpath is fully enclosed by the Proposed Development and all footpaths are set within green lanes.
Woolsthorpe Lane and Munston									
Pegasus	**VP1: Footpath F80/3** Year 1	**High** *(high susceptibility x medium value)*	-	-	-	**Low**	**Moderate** *Significant*	Adverse	The north east fields of the Proposed Development would not be visible beyond Easthorpe Lane from this location. Development within the most northerly field of the Site may be partially visible in the distance. By year 15 hedgerows up to 3m would obscure the view of development within the northern part of the Site.
	VP1: Footpath F80/3 Year 15		-	-	-	**Negligible**	**Negligible** *Not significant*	Neutral	
	VP6: Footpath 18/3, Muston Bridge Year 1	**High** *(high susceptibility x medium value)*	-	-	-	**Low**	**Moderate** *Not significant*	Adverse	Allowing the existing hedgerow along the south eastern edge (north of the byway) to grow up (maximum 3m) and enhancing with infill planting where needed would provide a good level of screening. With the above measures in place the amount of the Proposed Development visible would be significantly reduced at year 15.
	VP6: Footpath 18/3, Muston Bridge Year 15		-	-	-	**Low-negligible**	**Moderate-negligible** *Not significant*	Adverse	
LDA	**VRG2: Woolsthorpe Lane and Munston** Year 1	**High – Medium** *(high susceptibility x community value)*	Medium	Limited	Medium to long–term	**Medium**	**Moderate** *Not Significant*	Adverse	There will generally be medium scale effects on the views from local roads and PRoW within the localised area on the fringes of the village (before planting matures) due to the introduction of new structures into the landscape and change to the composition of the view, albeit the Proposed Development will still be seen at some distance; will not break the skyline; and will not obscure views across the wider countryside. The proposed landscape strategy would be beneficial, with new hedgerows planting helping to 'gap' existing field boundaries along the north-eastern edge of the Appeal Site, and with new tree planting providing further filtering of views
	VRG2: Woolsthorpe Lane and Munston Year 15		Small	Limited	Permanent	**Low-negligible**	**Slight** *Not significant*	Adverse	
Belvoir Ridge									
Pegasus	**VP9: Jubilee Way** Year 1	**High** *(high susceptibility x high value)*	-	-	-	**Low**	**Moderate** *Not significant*	Adverse	There would be a view of the Proposed Development within view, however this would be at some distance (1.65km). The view would benefit in summer months by existing surrounding vegetation is in full leaf. The proposed development would sit low in the landscape and within a far-reaching view which has wind turbines and industrial features within it. The fore and mid ground vale landscape would remain unchanged within the view. By Year 15 the Proposed Development would be further screened within the view by maturing hedgerows and hedgerow trees.
	VP9: Jubilee Way Year 15		-	-	-	**Low-negligible**	**Moderate – Negligible** *Not significant*	Adverse – Neutral	

LDA	**VRG3: Belvoir Ridge** Year 1 and Year 15	**High** *(high susceptibility x local value)*	Small-negligible	Limited	Permanent	**Low-negligible**	**Slight** *Not significant*	Adverse	There will be small-negligible scale effects on the views from along the edge of ridgeline. The Proposed Development will not be a prominent feature in the view; will still be seen at some distance; will not break the skyline; will not obscure views across the wider countryside; will be seen in context of more distant wind turbine and industrial land-uses on the urban fringe of Grantham and along the A1 corridor; and will have no discernible effect on the overall composition of the view.
Belvoir Road									
Pegasus	**VP11: Footpath G2/3** Year 1	**High** *(high susceptibility x medium value)*	-	-	-	**Low**	**Moderate** *Not significant*	Adverse	There would be a partial glimpsed view of the completed Proposed Development within the eastern fields of the Site. The view would benefit in summer months by existing vegetation in full leaf. Allowing the existing hedgerows to grow up (maximum 3m) would provide some level of screening. With the above measures in place the amount of the Proposed Development visible in the context of the wider view would be small at year 15.
	VP11: Footpath G2/3 Year 15		-	-	-	**Low-negligible**	**Moderate – Negligible** *Not significant*	Adverse – Neutral	
LDA	**VRG4: Belvoir Road** Year 1	**High – Medium** *(high susceptibility x community value)*	Medium-Small	Localised	Medium to long–term	**Medium-Low**	**Moderate-Slight** *Not significant*	Adverse	There will be small scale effects on the views from local roads and PRoW (before planting matures) due to the introduction of new structures into the landscape and change to the composition of the view, albeit the Proposed Development will still be seen at some distance; will not break the skyline; and will not obscure views across the wider countryside. The Proposed Development will be partially screened by small, intervening woodland copses in the landscape. The proposed Landscape Strategy would be beneficial, with new planting further filtering views.
	VRG4: Belvoir Road Year 15		Small	Localised	Permanent	**Low-negligible**	**Slight-Minimal** *Not significant*	Adverse	
Beacon Hill									
Pegasus	**VP15: Bridleway F86a/2, Beacon Hill** Year 1	**High** *(high susceptibility x medium value)*	-	-	-	**Low**	**Moderate** *Not significant*	Adverse	There would be a view of the Proposed Development within view. The view would benefit in summer months by existing vegetation in full leaf. By Year 15 the Proposed Development would be further screened within the view by maturing hedgerows and hedgerow trees.
	VP15: Bridleway F86a/2, Beacon Hill Year 15		-	-	-	**Low-negligible**	**Moderate – Negligible** *Not significant*	Adverse – Neutral	
LDA	**VRG5: Beacon Hill** Year 1 and 15	**High – Medium** *(high susceptibility x community value)*	Small-negligible	Limited	Permanent	**Low-negligible**	**Slight - Minimal** *Not significant*	Adverse	There will small-negligible scale effects on the views within the localised area of Beacon Hill due to the introduction of new structures into the landscape, albeit the Proposed Development will still be seen at some distance; will not break the skyline; will not obscure views across the wider countryside or Belvoir ridge; and will have little effect on the overall composition of the view.

Appendix 4: LVIA Methodology

Landscape and Visual Impact Methodology

1.0 Summary Methodology

1.1. Overview

"Landscape and Visual Impact Assessment is a tool used to identify and assess the significance of and the effects of change resulting from development on both the landscape as an environmental resource in its own right and people's views and visual amenity." (GLVIA 3, para. 1.1).

Paras. 2.20-2.22 of the same guidance indicate that the two components (assessment of landscape effects, and assessment of visual effects) are *"related but very different considerations"*.

The assessment method for this LVIA draws upon the established GLVIA3; An Approach to Landscape Character Assessment (Natural England, 2014), Landscape Institute Technical Information Note (LI TIN) 05/2017 regarding townscape character; LI TGN 02/2019 Residential Visual amenity assessment (RVAA); Landscape Institute's Technical Guidance Notes 02-21: Assessing landscape value outside national designations; LI Technical Guidance Note 06/19 Visual Representation of development proposals and other recognised guidelines.

The methodology is described in more detail in **Section 2.0.**

1.2. Assessment Terminology and Judgements

A full glossary is provided in **Section 3.0**. The key terms used within this assessment are:

- Susceptibility and Value – which contribute to Sensitivity of the receptor;
- Scale, Duration and Extent - which contribute to the Magnitude of effect; and
- Significance.

These terms are described in more detail below.

1.3. Sensitivity of the Receptor

Susceptibility indicates the ability of a landscape or visual receptor to accommodate the proposed development *"without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies."* (GLVIA3, para. 5.40).

High	Undue consequences are likely to arise from the proposed development.
Medium	Undue consequences may arise from the proposed development.
Low	Undue consequences are unlikely to arise from the proposed development.

Susceptibility of landscape character areas is influenced by their characteristics and is frequently considered (though often recorded as 'sensitivity' rather than susceptibility) within documented landscape character assessments and capacity studies.

Susceptibility of designated landscapes is influenced by the nature of the special qualities and purposes of designation and/or the valued elements, qualities or characteristics, indicating the degree to which these may be unduly affected by the development proposed.

Susceptibility of accessible or recreational landscapes is influenced by the nature of the landscape involved; the likely activities and expectations of people within that landscape and the degree to which those activities and expectations may be unduly affected by the development proposed.

Susceptibility of visual receptors is primarily a function of the expectations and occupation or activity of the receptors (GLVIA 3rd version, para 6.32).

Landscape Value is *"the relative value that is attached to different landscapes by society"* (GLVIA3, page 157).

National/International	Designated landscapes which are nationally or internationally designated for their landscape value.
Local / District	Locally or regionally designated landscapes; also areas which documentary evidence and/or site observation indicates as being more valued than the surrounding area.
Community	'Everyday' landscape which is appreciated by the local community but has little or no wider recognition of its value.
Limited	Despoiled or degraded landscape with little or no evidence of being valued by the community.

Areas of landscape of greater than Community value may be considered to be 'valued landscapes' in the context of NPPF paragraph 180.

Sensitivity is assessed by combining the considerations of susceptibility and value described above. The differences in the tables below reflect a slightly greater emphasis on value in considering landscape receptors, and a greater emphasis on susceptibility in considering visual receptors.

Sensitivity is assessed by combining the considerations of susceptibility and value described above. The differences in the tables below reflect a slightly greater emphasis on value in considering landscape receptors, and a greater emphasis on susceptibility in considering visual receptors.

Landscape Sensitivity		**Susceptibility**		
		High	**Medium**	**Low**
Valu	**National/International**	High	High-Medium	Medium

	Local/District	High-Medium	Medium	Medium-Low
	Community	Medium	Medium-Low	Low
	Limited	Low	Low-Negligible	Negligible
Visual Receptor Sensitivity		**Susceptibility**		
		High	**Medium**	**Low**
Value	**National/International**	High	High-Medium	Medium
	Local/District	High-Medium	High-Medium	Medium
	Community	High-Medium	Medium	Medium-Low
	Limited	Medium	Medium-Low	Low

For visual receptors; susceptibility and value are closely linked - the most valued views are also likely to be those where viewer's expectations will be highest. The value attributed relates to the value of the view, e.g. a National Trail is nationally valued for access, not necessarily for the available views. Typical examples of visual receptor sensitivity are plotted in a diagram in **Appendix 3**.

1.4. Magnitude of Effect

Scale of effect is assessed for all landscape and visual receptors and identifies the degree of change which would arise from the development.

Large	Total or major alteration to key elements, features, qualities or characteristics, such that post development the baseline will be fundamentally changed.
Medium	Partial alteration to key elements, features, qualities or characteristics, such that post development the baseline will be noticeably changed.
Small	Minor alteration to key elements, features, qualities or characteristics, such that post development the baseline will be largely unchanged despite discernible differences.
Negligible	Very minor alteration to key elements, features, qualities or characteristics, such that post development the baseline will be fundamentally unchanged with barely perceptible differences.

Duration of effect is assessed for all landscape and visual receptors and identifies the time period over which the change to the receptor as a result of the development would arise.

Permanent	The change is expected to be permanent and there is no intention for it to be reversed.
Long-term	The change is expected to be in place for 10-25 years and will be reversed, fully mitigated or no longer occurring beyond that timeframe.
Medium-term	The change is expected to be in place for 2-10 years and will be reversed, fully mitigated or no longer occurring beyond that timeframe.
Short-term	The change is expected to be in place for 0-2 years and will be reversed, fully mitigated or no longer occurring beyond that timeframe.

Most effects will be Long term or Permanent; however, Medium or Short term effects may be identified where mitigation planting is proposed or local factors will result in a reduced duration of effect (for example where maturing woodland will screen views in future). The effects arising from the construction of the development will usually be Short term.

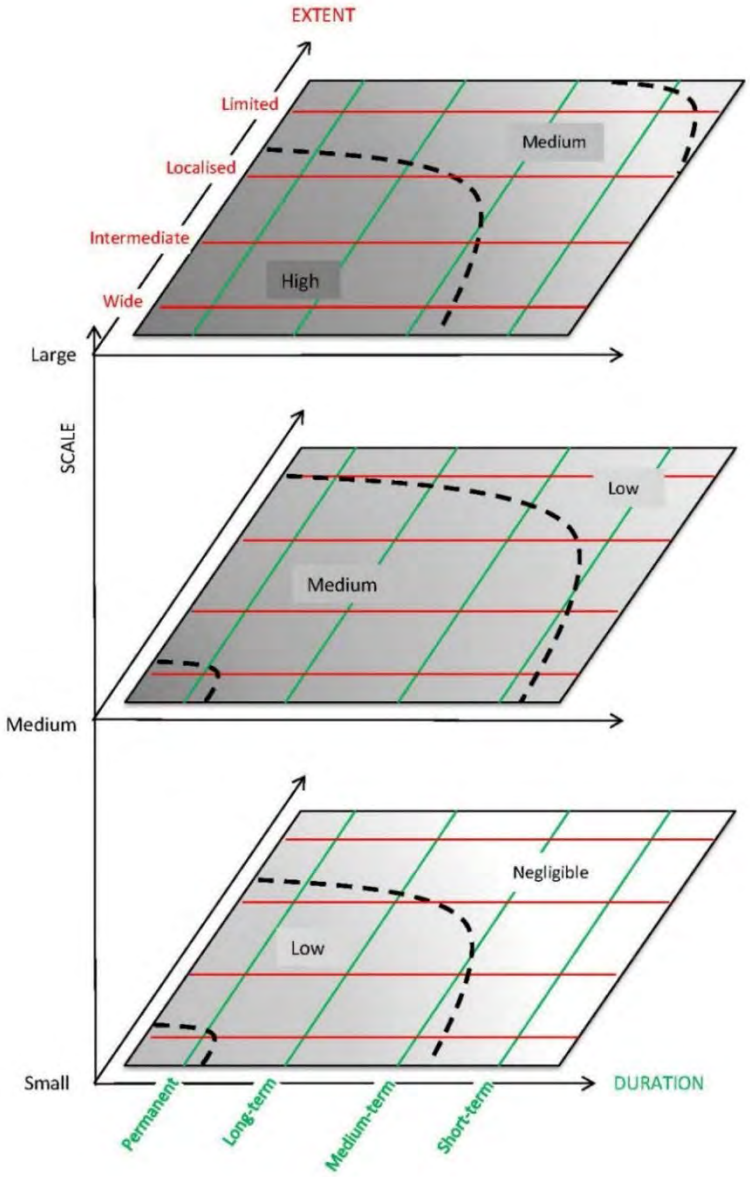
In relation to renewable solar farm and battery storage development, the operational lifespan is commonly for up to 40 years upon which all of the development is fully reversible and can be removed and the land returned to its original use. However, while this represents a 'non-permanent' change, in line with the above methodology, a **permanent** duration is used for the purposes of the LVIA.

Extent of effects is assessed for all receptors and indicates the geographic area over which the effects will be felt.

Wide	Beyond 4km, or more than half of receptor.
Intermediate	Up to approx. 2-4km, or around half of receptor area.
Localised	Site and surroundings up to 2km, or part of receptor area (up to approx. 25%).
Limited	Site, or part of site, or small part of a receptor area (< approx. 10%).

The **Magnitude** of effect is informed by combining the scale, duration and extent of effect. **Diagram 1** below illustrates the judgement process:

Diagram 1: Magnitude of Effect



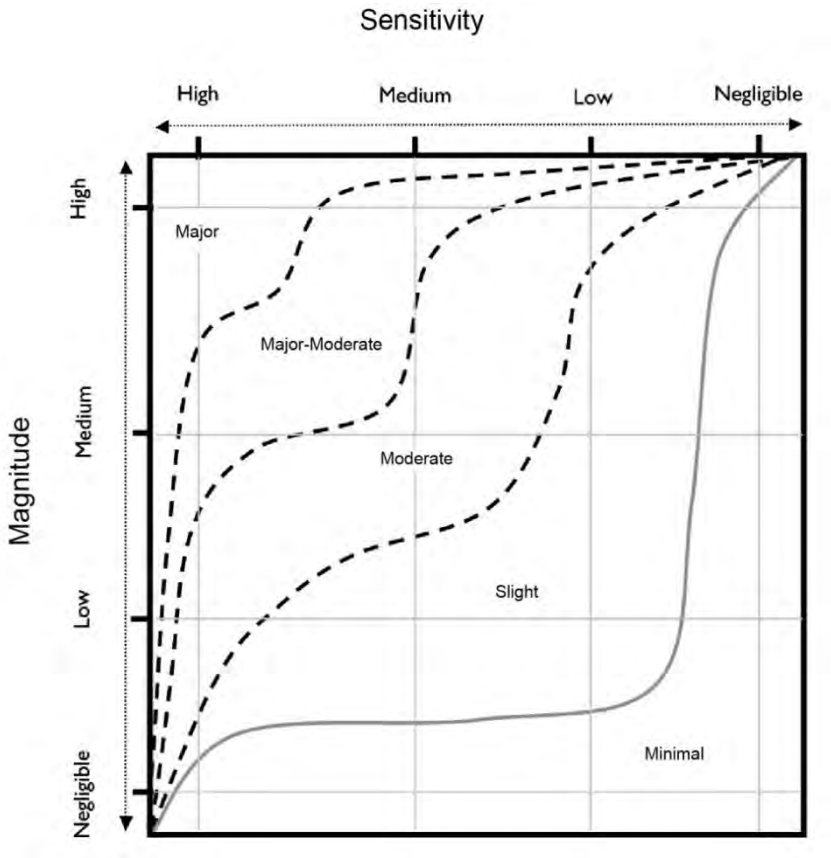
As can be seen from the illustration above, scale (shown as the layers of the diagram) is the primary factor in determining magnitude; most of each layer indicates that magnitude will typically be judged to be the same as scale, but may be higher if the effect is particularly widespread and long lasting, or lower if it is constrained in geographic extent or timescale. Where the Scale of effect is judged to be Negligible the Magnitude is also assumed to be Negligible and no further judgement is required.

1.5. Significance

Significance indicates the importance or gravity of the effect. The process of forming a judgement as to the degree of significance of the effect is based upon the assessments of

magnitude of effects and sensitivity of the receptor to come to a professional judgement of how important this effect is. This judgement is illustrated by the diagram below:

Diagram 2: Significance



The significance ratings indicate a 'sliding scale' of the relative importance of the effect, with Major being the most important and Minimal being the least. Effects that are Major-Moderate or Major are considered to be significant. Effects of Moderate significance or less are "of lesser concern" (GLVIA, 3rd edition, para 3.35). It should also be noted that whilst an effect may be significant, that does not necessarily mean that such an impact would be unacceptable, or should necessarily be regarded as an "undue consequence" (GLVIA, 3rd edition, para 5.40)."

Where intermediate ratings are given, e.g. "Moderate-Slight", this indicates an effect that is both less than Moderate and more than Slight, rather than one which varies across the range. In such cases, the higher rating will always be given first; this does not mean that the impact is closer to that higher rating but is done to facilitate the identification of the more significant effects within tables. Intermediate judgements may also be used for judgements of Magnitude.

Positive / Adverse / Neutral

Effects are defined as adverse, neutral or positive. Neutral effects are those which overall are neither adverse nor positive but may incorporate a combination of both.

The decision regarding the significance of effect and the decision regarding whether an effect is beneficial or adverse are entirely separate. For example, a rating of Major and Positive would indicate an effect that was of great significance and on balance positive, but not necessarily that the proposals would be extremely beneficial.

Whether an effect is Positive, Neutral or Adverse is identified based on professional judgement. GLVIA 3rd edition indicates at paragraph 2.15 that this is a "particularly challenging" aspect of assessment, particularly in the context of a changing landscape.

1.6. Distances

Where distances are given in the assessment, these are approximate distances between the nearest part of the Site and the nearest part of the receptor in question, unless explicitly stated otherwise.

2.0 Detailed Methodology

2.1. Introduction

This appendix contains additional detail regarding the assessment methodology, supplementing the information provided within the LVIA text. This appendix sets out a standard approach – specific matters in terms of the scope of assessment, study area and modifications to the standard approach for this assessment are set out within the LVIA.

The methodology has the following key stages, which are described in more detail in subsequent sections, as follows:

- Baseline – includes the gathering of documented information; agreement of the scope of the assessment with the EIA co-ordinator and local planning authority; site visits and initial reports to the EIAA co-ordinator of issues that may need to be addressed within the design.
- Design – input into the design / review of initial design / layout / options and mitigation options.
- Assessment – includes an assessment of the landscape and visual effects of the scheme, requiring site based work and the completion of a full report and supporting graphics.
- Cumulative Assessment – assesses the effects of the proposal in combination with other developments, where required.

2.2. Baseline

The baseline study establishes the planning policy context, the scope of the assessment and the key receptors. It typically includes the following key activities:

A desk study of relevant current national and local planning policy, in respect of landscape and visual matters, for the site and surrounding areas.

Agreement of the main study area radius with the local planning authority.

A desk study of nationally and locally designated landscapes for the site and surrounding areas.

A desk study of existing landscape character assessments and capacity and sensitivity studies for the site and surrounding areas.

A desk study of historic landscape character assessments (where available) and other information sources required to gain an understanding of the contribution of heritage assets to the present day landscape.

Collation and evaluation of other indicators of local landscape value such as references in landscape character studies or parish plans, tourist information, local walking & cycling guides, references in art and literature.

The identification of valued character types, landscape elements and features which may be affected by the proposal, including rare landscape types.

Exchanging information with other consultants working on other assessment topics for the development as required to inform the assessment.

Draft Zone of Theoretical Visibility (ZTV) studies to assist in identifying potential viewpoints and indicate the potential visibility of the proposed development, and therefore scope of receptors likely to be affected. The methodology used in the preparation of ZTV studies is described within Appendix 12.4.

The identification of and agreement upon, through consultation, the scope of assessment for cumulative effects.

The identification of and agreement upon, through consultation, the number and location of representative and specific viewpoints within the study area.

The identification of the range of other visual receptors (e.g. people travelling along routes, or within open access land, settlements and residential properties) within the study area.

Site visits to become familiar with the site and surrounding landscape; verify documented baseline; and to identify viewpoints and receptors.

2.3. Input to the design process.

The information gathered during the baseline assessment is drawn together and summarised in the baseline section of the report and reasoned judgements are made as to which receptors are likely to be significantly affected. Only these receptors are then taken forward for the detailed assessment of effects (ref. GLVIA 3rd edition, 2013, para 3.19).

2.4. Design

The design and assessment stages are necessarily iterative, with stages overlapping in parts. Details of any mitigation measures incorporated within the proposals to help reduce identified potential landscape and visual effects are set out within the LVIA.

2.5. Assessment

The assessment of effects includes further desk and site based work, covering the following key activities:

The preparation of a ZTV based on the finalised design for the development.

An assessment, based on both desk study and site visits, of the sensitivity of receptors to the proposed development.

An assessment, based on both desk study and site visits, of the magnitude and significance of effects upon the landscape character, designated and recreational landscape and the existing visual environment arising from the proposed development.

An informed professional judgements as to whether each identified effect is positive, neutral or adverse.

A clear description of the effects identified, with supporting information setting out the rationale for judgements.

Identification of which effects are judged to be significant based on the significance thresholds set out within the LVIA

The production of photomontages from a selection of the agreed viewpoints showing the anticipated view following construction of the proposed development.

2.6. Site

The effect of physical changes to the site are assessed in terms of the effects on the landscape fabric.

2.7. Landscape and Townscape Character Considerations

The European Landscape Convention (2000) provides the following definition:

"Landscape means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors."

And notes also in Article 2 that landscape includes *"natural, rural, urban and peri-urban areas. It includes land, inland water and marine areas".*

An Approach to Landscape Character Assessment (Natural England, 2014) defines landscape character as:

"a distinct and recognisable pattern of elements, or characteristics, in the landscape that make one landscape different from another, rather than better or worse."

The susceptibility of landscape character areas is judged based on both the attributes of the receiving environment and the characteristics of the proposed development as discussed under 'susceptibility' within the methodology section of the LVIA. Thus, the key characteristics of the landscape character types/areas are considered, along with scale, openness, topography; the absence of, or presence, nature and patterns of development, settlement, landcover, the contribution of heritage assets and historic landscape elements and patterns, and land uses in forming the character. The condition of the receiving landscape, i.e. the intactness of the existing character will also be relevant in determining susceptibility. The likelihood of material effects on the landscape character areas can be judged based on the scale and layout of the proposal and how this relates to the characteristics of the receiving landscape.

The introduction of any development into a landscape adds a new feature which can affect the 'sense of place' in its near vicinity, but with distance, the existing characteristics reassert themselves.

The baseline is informed by desk study of published landscape character assessments and field survey. It is specifically noted within An Approach to Landscape Character Assessment (Natural England, 2014) that:

"Our landscapes have evolved over time and they will continue to evolve – change is a constant but outcomes vary. The management of change is essential to ensure that we achieve sustainable outcomes – social, environmental and economic. Decision makers need to understand the baseline and the implications of their decisions for that baseline."

At page 51 it describes the function of Key Characteristics in landscape assessment, as follows:

"Key characteristics are those combinations of elements which help to give an area its distinctive sense of place. If these characteristics change, or are lost, there would be significant consequences for the current character of the landscape. Key characteristics are particularly important in the development of planning and management policies. They are important for monitoring change and can provide a useful reference point against which landscape change can be assessed. They can be used as indicators to inform thinking about whether and how the landscape is changing and whether, or not, particular policies – for example - are effective and having the desired effect on landscape character."

It follows from the above that in order to assess whether landscape character is significantly affected by a development, it should be determined how each of the key characteristics would be affected. The judgement of magnitude therefore reflects the degree to which the key characteristics and elements which form those characteristics will be altered by the proposals.

2.8. Landscape value - considerations

Paragraph 5.19 of GLVIA states that *"A review of existing landscape designations is usually the starting point in understanding landscape value, but the value attached to undesignated landscapes also needs to be carefully considered and individual elements of the landscape- such as trees, buildings or hedgerows -may also have value. All need to be considered where relevant."*

Paragraph 5.20 of GLVIA indicates information which might indicate landscape value, including:

- Information about areas recognised by statute such as National Parks, Areas of Outstanding Natural Beauty;
- Information about Heritage Coasts, where relevant;
- Local planning documents for local landscape designations;
- Information on features such as Conservation Areas, listed buildings, historic or cultural sites;
- Art and literature, identifying value attached to particular areas or views; and
- Material on landscapes of local or community interest, such as local green spaces, village greens or allotments.

An assessment of landscape value is made based on the following factors outlined in Table 1 of the Landscape Institute's 'Technical Guidance Notes 02-21: Assessing landscape value outside national designations': natural heritage; cultural heritage; landscape condition; associations; distinctiveness; recreational; perceptual (scenic); perceptual (wildness and tranquillity); and functional.

In addition to the above list, consideration is given to any evidence that indicates whether the landscape has particular value to people that would suggest that it is of greater than 'Community' value.

2.9. Viewpoints and Visual Receptors – considerations

A wide variety of visual receptors can reasonably be anticipated to be affected by the proposed development. Within the baseline assessment, the ZTV study and site visits are used to determine which visual receptors are likely to be significantly affected and therefore merit detailed assessment. In line with guidance (GLVIA, 3rd Edition, 2013); both representative and specific viewpoints may be identified to inform the assessment. In general, the majority of viewpoints will be representative – representing the visual receptors at the distance and direction in which they are located and of the type(s) that would be present at that location. The representative viewpoints have generally been selected in locations where significant effects would be anticipated; though some may be selected outside of that zone – either to demonstrate the reduction of effects with distance; or to specifically ensure the representation of a particularly sensitive receptor.

The types of visual receptors likely to be included with the assessment are:

- Users of walking routes or accessible landscapes including Public Rights of Way, National and Regional Trails and other long distance routes, Common Land, Open Access Land, permissive paths, land held in trust (e.g. Woodland Trust, National Trust) offering free public access, and other regularly used, permitted walking routes;
- Visitors to and residents of settlements;
- Visitors to specific valued viewpoints;
- Visitors to attractions or heritage assets for which landscape and views contribute to the experience; and
- Users of roads or identified scenic routes.
- Visual receptors are grouped for assessment into areas which include all of the routes, public spaces and homes within that area. Groups are selected as follows:
- Based around settlements in order to describe effects on that that community – e.g. a settlement and routes radiating from that settlement; or
- An area of open countryside encompassing a number of routes, accessible spaces and individual dwellings; or
- An area of accessible landscape and the routes within and around it e.g. a country park; and
- such that effects within a single visual receptor group are similar enough to be readily described and assessed.

With the exception of specific viewpoints, each route, settlement or location will encompass a range of possible views, which might vary from no view of the development to very clear, close views. Therefore, effects are described in such a way as to identify where views towards the development are likely to arise and what the scale, duration and extent of those views are likely to be. In some cases, this will be further informed by a nearby viewpoint and in others it will be informed with reference to the ZTV, aerial photography and site visits. Each of these individual effects are then considered together in order to reach a judgement of the effects on the visual receptors along that route, or in that place.

The representative viewpoints are used as 'samples' on which to base judgements of the scale of effects on visual receptors. The viewpoints represent multiple visual receptors, and duration and extent are judged when assessing impacts on the visual receptors.

For specific viewpoints (key and sometimes promoted viewpoints within the landscape), duration and extent are assessed, with extent reflecting the extent to which the development affects the valued qualities of the view from the specific viewpoint.

Visual Receptor Sensitivity – typical examples

	High	Medium	Low
National/International	1	4	8
Local/District	2	5	8
Community	3	6	9
Limited		7	10
Visitors to valued viewpoints or routes which people might visit purely to experience the view, e.g. promoted or well-known viewpoints, routes from which views that form part of the special qualities of a designated landscape can be well appreciated; key designed views; panoramic viewpoints marked on maps. People in locations where they are likely to pause to appreciate the view, such as from local waypoints such as benches; or at key views to/from local landmarks. Visitors to local attractions, heritage assets or public parks where views are an important contributor to the experience, or key views into/out of Conservation Areas. People in the streets around their home, or using public rights of way, navigable waterways or accessible open space (public parks, open access land). Users of promoted scenic rail routes. Users of promoted scenic local road routes. Users of cycle routes, local roads and railways. Outdoor workers. Users of A-roads which are nationally or locally promoted scenic routes. Users of sports facilities such as cricket grounds and golf courses. Users of Motorways and A-roads; shoppers at retail parks, people at their (indoor) places of work.			

2.10. Preparation and use of Visuals

The ZTVs are used to inform the field study assessment work, providing additional detail and accuracy to observations made on site. Photomontages may also be produced in order

to assist readers of the assessment in visualising the proposals, but are not used in reaching judgements of effect. The preparation of the ZTVs (and photomontages where applicable) is informed by the Landscape Institute's Technical Guidance Note 06/19 'Visual Representation of development proposals' and SNH 'Visual Representation of Wind Farms Best Practice Guidance' (both the 2007 and 2017 editions).

The following points should be borne in mind in respect of the ZTV study:

Areas shown as having potential visibility may have visibility of the development obscured by local features such as trees, hedgerows, embankments or buildings.

A detailed description of the methods by which ZTVs and visualisations are prepared is included in Appendix 4.

In addition to the main visualisations, illustrative views are used as appropriate to illustrate particular points made within the assessment. These are not prepared to the same standard as they simply depict existing views, character or features rather than forming the basis for visualisations.

2.11. Cumulative Assessment

Cumulative assessment relates to the assessment of the effects of more than one development. A search area from the proposal site (typically of a similar scale to the study area) is agreed with the planning authority. For each of the identified cumulative schemes agreement is reached with the Planning Authority as to whether and how they should be included in the assessment.

Developments that are subject to a valid planning application are included where specific circumstances indicate there is potential for cumulative effects to occur, with progressively decreasing emphasis placed on those which are less certain to proceed. Typically, operational and consented developments are treated as being part of the landscape and visual baseline. i.e. it is assumed that consented schemes will be built except for occasional exceptions where there is good reason to assume that they will not be constructed.

The cumulative assessment examines the same groups of landscape and visual receptors as the assessment for the main scheme, though different viewpoints may be used in order to better represent the likely range of effects arising from the combination of schemes. The assessment is informed by cumulative ZTVs as necessary, showing the extent of visual effects of the schemes in different colours to illustrate where visibility of more than one development is likely to arise. Cumulative wirelines or photomontages may also be prepared.

In addition, the effects on users of routes through the area, from which developments may be sequentially visible as one passes through the landscape are also considered, if appropriate. This assessment is based on the desk study of ZTVs and aerial photography, and site visits to travel along the routes being assessed.

In relation to landscape and visual cumulative assessment, it is important to note the following:

For each assessed receptor, combined cumulative effects may be the same as for the application scheme, or greater (where the influence of multiple schemes would increase

effects, or where schemes in planning other than the application scheme would have the predominant effects).

For each assessed receptor, incremental cumulative effects may be the same as for the application scheme, or reduced (where the influence of other schemes in planning would be such that were they consented and considered to be part of the baseline, the incremental change arising from the addition of the application scheme would be less).

Subject to the distance and degree of intervening landform, vegetation and structures there may be no cumulative effects.

The way in which the assessment is described and presented is varied depending on the number and nature of scenarios which may arise. This variation is needed in order to convey to the reader the key points of each assessment. For example, the three different cumulative combinations that may arise for an assessment in which there are two existing undetermined applications each can be assessed individually. A situation in which there are 10 applications cannot reasonably be assessed in this way and the developments may need to be grouped for analysis.

2.12. Residential Amenity

Paragraph 6.17 of GLVIA, 3rd edition notes that:

"In some instances it may also be appropriate to consider private viewpoints, mainly from residential properties…. Effects of development in private property are frequently dealt with mainly through 'residential amenity assessments'. These are separate from LVIA although visual effects assessment may sometimes be carried out as part of a residential amenity assessment, in which case this will supplement and form part of the LVIA for a project. Some of the principles set out here for dealing with visual effects may help in such assessments but there are specific requirements in residential amenity assessment"

The guidance also notes that:

"In respect of private views and visual amenity, it is widely known that, no one has 'a right to a view.' This includes situations where a residential property's outlook / visual amenity is judged to be 'significantly' affected by a proposed development, a matter which has been confirmed in a number of appeal / public inquiry decisions."

It is important to note:

"Judgements formed in respect of Residential Visual Amenity should not be confused with the judgement regarding Residential Amenity because the latter is a planning matter. Nor should the judgment therefore be seen as a 'test' with a simple 'pass' or 'fail'.

… The final judgement regarding effect on Residential Amenity … requires weighing all factors and likely effects (positive as well as negative) in the 'planning balance'."

The guidance notes that many appeal decisions in which residential visual amenity is considered relate to wind farms. Wind farms are unusually tall developments with a greater chance that they could have such an effect. Most forms of development are unlikely to cause effects of such a high magnitude to render a property an unattractive place in which to live unless in very close to the property and occupying a large proportion of views.

Residential properties closest to the site are viewed on site and from aerial photography to consider whether a residential amenity assessment is required. Where such an assessment is required, it is provided as an appendix to the LVIA and in accordance with the guidance provided in LI TGN 02/2019.

3.0 Glossary

Cumulative effects. The additional changes caused by a proposed development in conjunction with other similar developments or as the combined effect of a set of developments, taken together.

Illustrative Viewpoint. A viewpoint chosen specifically to demonstrate a particular effect or specific issues, which might, for example, be the restricted visibility at certain locations.

Landscape Character Areas. These are single unique areas which are the discrete geographical areas of a particular landscape type.

Landscape Character Type. These are distinct types of landscape that are relatively homogeneous in character. They are generic in nature in that they may occur in different areas in different parts of the country, but wherever they occur they share broadly similar combinations of geology, topography, drainage patterns, vegetation, and historical land use, and settlement pattern, and perceptual and aesthetic attributes.

Landscape effects. Effects on the landscape as a resource in its own right.

Landscape character. A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.

Landscape quality (or condition). A measure of the physical state of the landscape. It may include the extent to which typical character is represented in individual areas, the intactness of the landscape and the condition of individual elements.

Landscape receptors. Defined aspects of the landscape resource that have the potential to be affected by a proposal.

Landscape value. The relative value that is attached to different landscapes by society. A landscape may be valued by different stakeholders for a whole variety of reasons.

Magnitude (of effect). A term that combines judgements about the size and scale of the effect, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is short or long term, in duration.

Mitigation. Measures which are proposed to prevent, reduce and where possible offset any significant adverse effects (or to avoid, reduce and if possible remedy identified effects).

Representative Viewpoint. A viewpoint selected to represent the experience of different types of visual receptor, where larger numbers of viewpoints cannot all be included individually and where the significant effects are unlikely to differ.

Sensitivity. A term applied to specific receptors, combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value related to that receptor.

Specific Viewpoint. A viewpoint because it is key and sometimes a promoted viewpoint within the landscape, including for example specific local visitor attractions, viewpoints in areas of particularly noteworthy visual and/or recreational amenity such as landscapes with statutory landscape designations, or viewpoints with particular cultural landscape associations.

Susceptibility. The ability of a defined landscape or visual receptor to accommodate the specific proposed development without undue negative consequences.

Visual amenity. The overall pleasantness of the views people enjoy of their surroundings, which provides an attractive visual setting or backdrop for the enjoyment of activities of people living, working, recreating, visiting or travelling through an area.

Visual effect. Effects on specific views and on the general visual amenity experienced by people.

Visual receptor. Individuals and/or defined groups of people who have the potential to be affected by a proposal.

Zone of Theoretical Visibility (ZTV). A map, usually digitally produced, showing areas of land within which a development is theoretically visible.

Definitions from Guidelines for Landscape and Visual Impact Assessment, 3rd Edition, Landscape Institute with the Institute of Environmental Management and Assessment, 2013.

Appendix 5: ZTV & Photomontage Methodology

Visualisations and ZTV Studies

1.1. ZTV Studies

ZTV studies are prepared using the ESRI ArcGIS Viewshed routine. This creates a raster image that indicates the visibility (or not) of the points modelled. LDA Design undertake a ZTV study that is designed to include visual barriers from settlements and woodlands (with heights derived from LiDAR surface mapping data). If significant deviations from these assumed heights are noted during site visits, for example young or felled areas of woodland, or recent changes to built form, the features concerned will be adjusted within the model or the adoption of a digital surface model will be used to obtain actual heights for these barriers. In this instance 1m resolution (resampled to 5m) LiDAR data has been used to include buildings and vegetation in the ZTV model.

The model is also designed to take into account both the curvature of the earth and light refraction, informed by the SNH guidance. LDA Design undertake all ZTV studies with observer heights of 2m.

The ZTV analysis begins at 1m from the observation feature and will work outwards in a grid of the set resolution until it reaches the end of the terrain map for the project.

For all plan production LDA Design will produce a ZTV that has a base and overlay of the 1:50,000 Ordnance Survey Raster mapping or better. The ZTV will be reproduced at a suitable scale on an A3 template to encompass the study area.

1.2. Ground model accuracy

Depending on the project and level of detail required, different height datasets may be used. Below is listed the different data products and their specifications:

Product	Distance Between Points	Vertical RMSE Error
LiDAR	50cm – 2m	up to +/- 5cm
Photogrammetrically Derived Heights	2m – 5m	up to +/- 1.5m
Ordnance Survey OS terrain 5	5 m	up to +/- 2.5m
NextMap25 DTM	25 m	+/- 2.06m
Ordnance Survey OS terrain 50	50 m	+/- 4m

Site-specific topographical survey data may also be used where available.

1.3. Photomontages and Photowires

Verified / verifiable photomontages are produced in seven stages. Photowires are produced using the same overall approach, but only require some of the steps outlined below.

1) Photography is undertaken using a full frame digital SLR camera and 50mm lens. A tripod is used to take overlapping photographs which are joined together using an industry standard application to create a single panoramic image for each viewpoint. These are then saved at a fixed height and resolution to enable correct sizing when reproduced in the final images. The photographer also notes the GPS location of the viewpoint and takes bearings to visible landmarks whilst at the viewpoint.

2) Creation of a ground model and 3D mesh to illustrate that model. This is created using LiDAR data (or occasionally other terrain datasets where required, such as site-specific topographical data or Photogrammetrically Derived Heights) and ground modelling software.

3) The addition of the proposed development to the 3D model. The main components of the proposed development are accurately modelled in CAD and are then inserted into the 3D model at the proposed locations and elevations.

4) Wireline generation – The viewpoints are added within the 3D CAD model with each observer point being inserted at 1.5m above the modelled ground plane. The location of the landmarks identified by the photographer may also be included in the model. The view from the viewpoint is then replicated using virtual cameras to create a series of single frame images, which also include bearing markers. As with the photographs, these single frame images are joined together using an industry standard application to create a single panoramic image for each viewpoint. These are then saved at a fixed height and resolution to ensure that they are the same size as the photographs.

5) Wireline matching – The photographs are matched to the wirelines using a combination of the visible topography, bearing markers and the landmarks that have been included in the 3D model.

6) For the photomontage, an industry standard 3D rendering application is used to produce a rendered 3D view of the proposed development from the viewpoint. If required / subject to the level of detail necessary, the rendering uses materials to match the intended surface finishes of the development and lighting conditions according to the date and time of the viewpoint photograph.

7) The rendered development is then added to the photograph in the position identified by the wireline (using an image processing application) to ensure accuracy. The images are then layered to ensure that the development appears in front of and behind the correct elements visible within the photograph. Where vegetation is proposed as part of the development, this is then added to the final photomontage.

In accordance with the guidance provided in Landscape Institute Technical Guidance Note 06/19 (Ref. 6), visualisations will be prepared to the technical methodology set out in below. The photowires and photomontages prepared in support of the LVIA will adhere to the Type 3 visualisation specification as surveyed locational accuracy is not generally necessary but image enlargement, to illustrate perceived scale, would be appropriate.

1.4. Technical Methodology

Information	Technical Response
Photography	
Method used to establish the camera location	Aerial photography in ESRI ArcGIS along with GPS reading taken on site
Likely level of accuracy of location	Better than 1m
If lenses other than 50mm have been used, explain why a different lens is appropriate	N/A
Written description of procedures for image capture and processing	See paragraph 6I.10.1 point 1 above
Make and type of Panoramic head and equipment used to level head	Manfrotto Levelling Head 338 and Manfrotto Panoramic Head MH057A5
If working outside the UK, geographic co-ordinate system (GCS) used	N/A
3D Model/Visualisation	
Source of topographic height data and its resolution	2m LiDAR digital terrain data
How have the model and the camera locations been placed in the software?	Georeferenced model supplied by engineers/architects Camera locations taken from photography viewpoint locations
Elements in the view used as target points to check the horizontal alignment	Existing buildings, infrastructure/road alignments, telegraph poles/street lighting/signage, field boundaries, DSM
Elements in the view used as target points to check the vertical alignment	Topography, existing buildings
3D Modelling / Rendering Software	Civil 3D / AutoCAD / 3DS Max / Rhino / V-Ray