

Green Hill Solar Farm

EN010170

Environmental Statement

Appendix 2.1: EIA Scoping Report

(Part 9 of 9)

Prepared by: Lanpro

Date: May 2025

Document Reference: APP/GH6.3.2.1

APFP Regulation 5(2)(a)

Green Hill Solar Farm

EIA Scoping Report Appendices

Part 8 of 8 (Appendices 11-21)

Revision A

Date: July 2024

PINS reference: EN010170



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Green Hill Solar Farm

EIA Scoping Report

Appendix 11: Minerals

Revision A

Prepared by: Ted Clover Planning

Date: July 2024

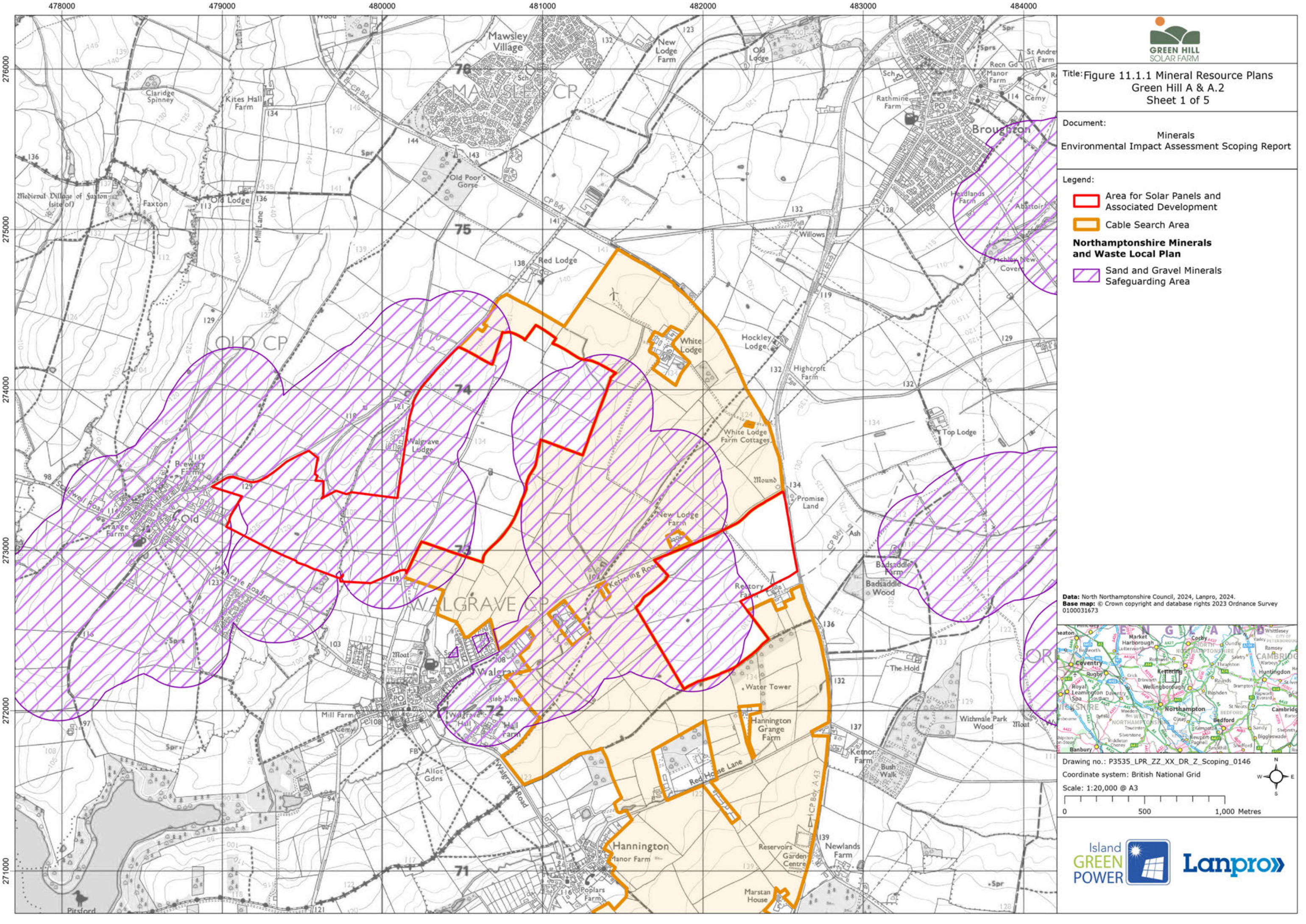
PINS reference: EN010170



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- 11.1.5 Mineral Resource Plans Green Hill G Sheet 5 of 5



Title: Figure 11.1.1 Mineral Resource Plans
Green Hill A & A.2
Sheet 1 of 5

Document:
Minerals
Environmental Impact Assessment Scoping Report

- Legend:
- Area for Solar Panels and Associated Development
 - Cable Search Area
 - Northamptonshire Minerals and Waste Local Plan**
 - Sand and Gravel Minerals Safeguarding Area

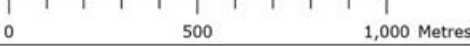
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Base map: © Crown copyright and database rights 2023 Ordnance Survey 0100031673

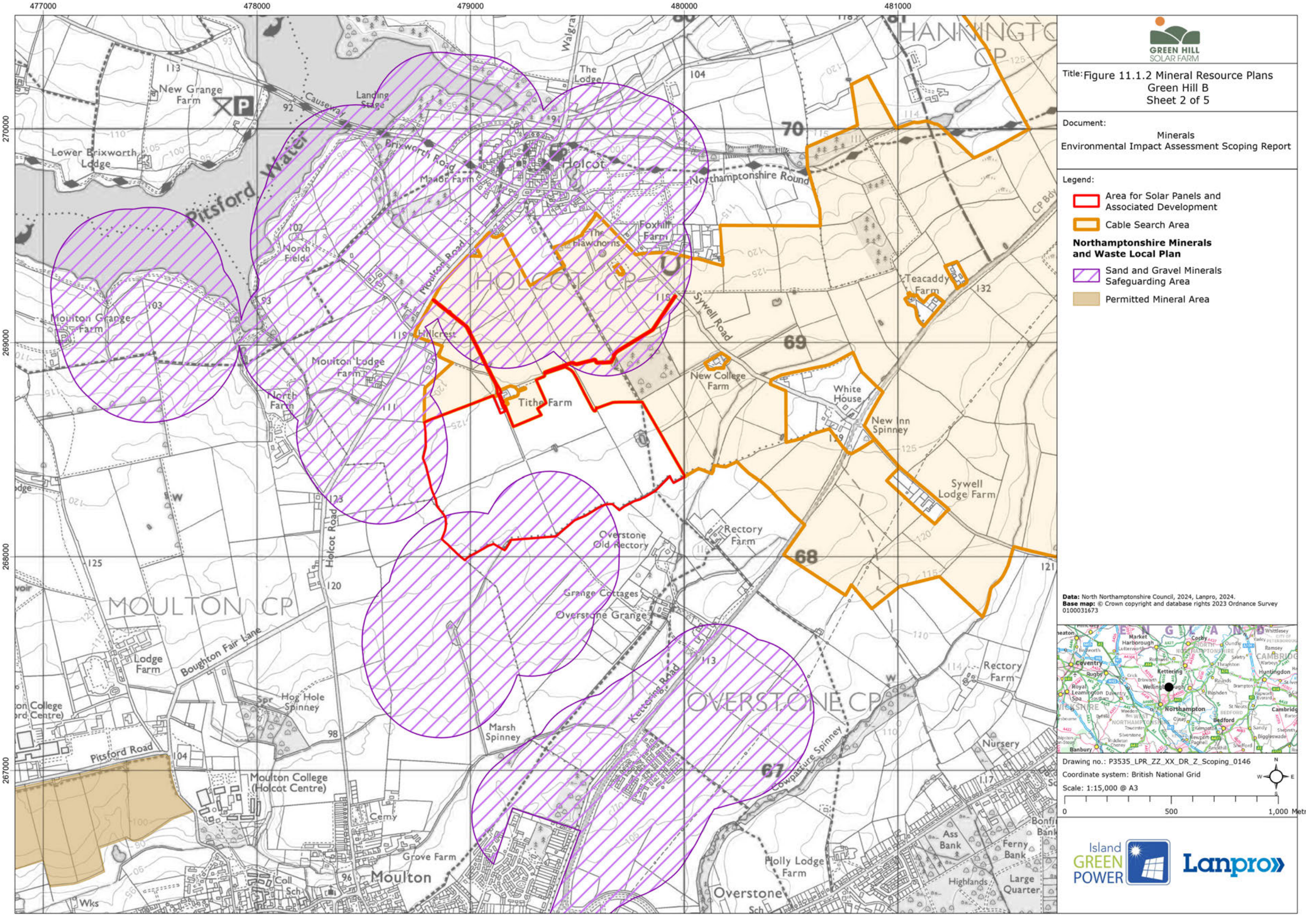


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Coordinate system: British National Grid

Scale: 1:20,000 @ A3





Title: Figure 11.1.2 Mineral Resource Plans
Green Hill B
Sheet 2 of 5

Document:
Minerals
Environmental Impact Assessment Scoping Report

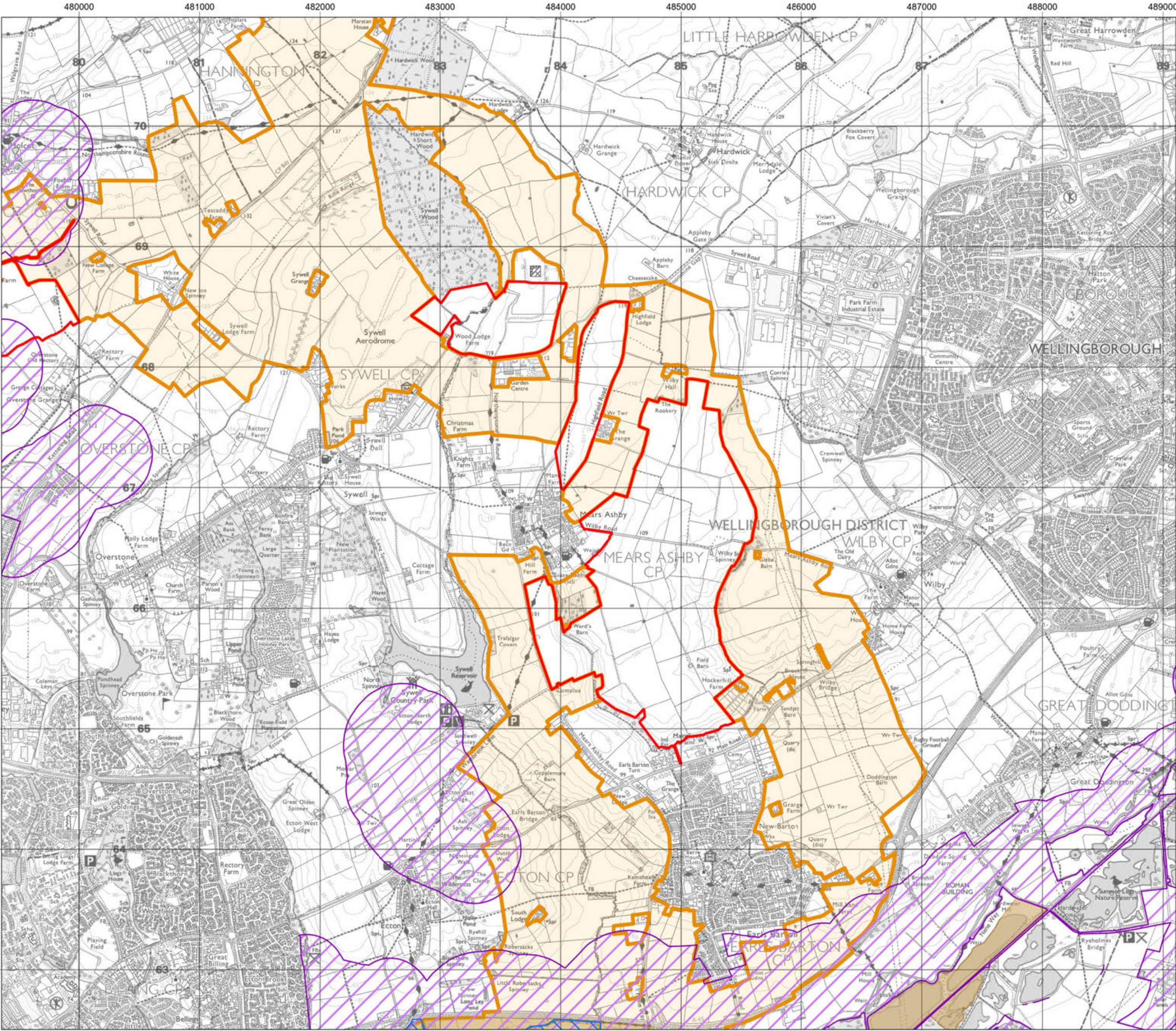
- Legend:
- Area for Solar Panels and Associated Development
 - Cable Search Area
 - Northamptonshire Minerals and Waste Local Plan**
 - Sand and Gravel Minerals Safeguarding Area
 - Permitted Mineral Area

Data: North Northamptonshire Council, 2024, Lanpro, 2024.
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Title: Figure 11.1.3 Mineral Resource Plans
Green Hill C, D & E
Sheet 3 of 5

Document:
Minerals
Environmental Impact Assessment Scoping Report

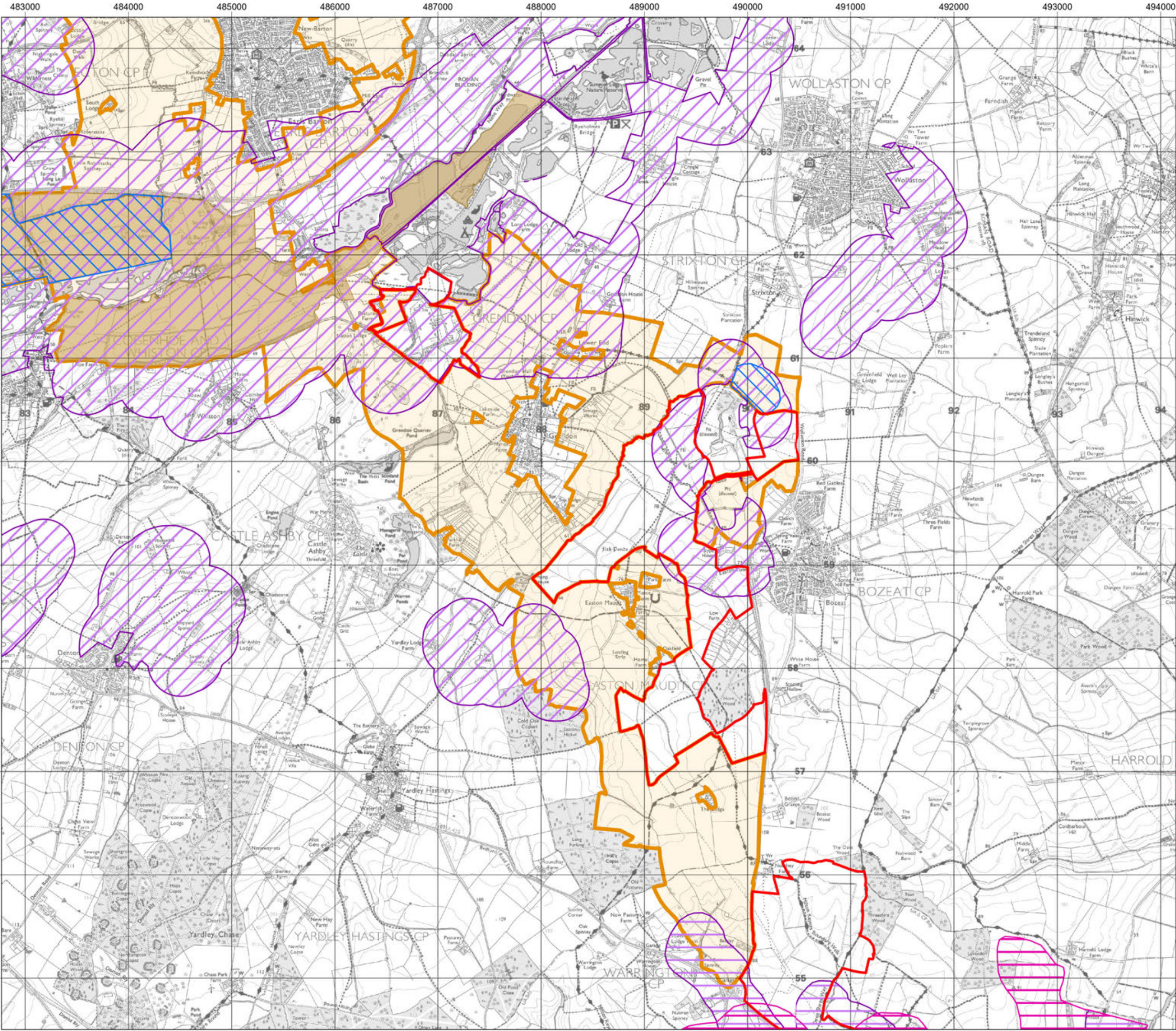
- Legend:
- Area for Solar Panels and Associated Development
 - Cable Search Area
 - Northamptonshire Minerals and Waste Local Plan**
 - Mineral Allocations
 - Sand and Gravel Minerals Safeguarding Area
 - Permitted Mineral Area

Data: North Northamptonshire Council, 2024, Lanpro, 2024.
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Title: Figure 11.1.4 Mineral Resource Plans
Green Hill F & BESS
Sheet 4 of 5

Document:
Minerals
Environmental Impact Assessment Scoping Report

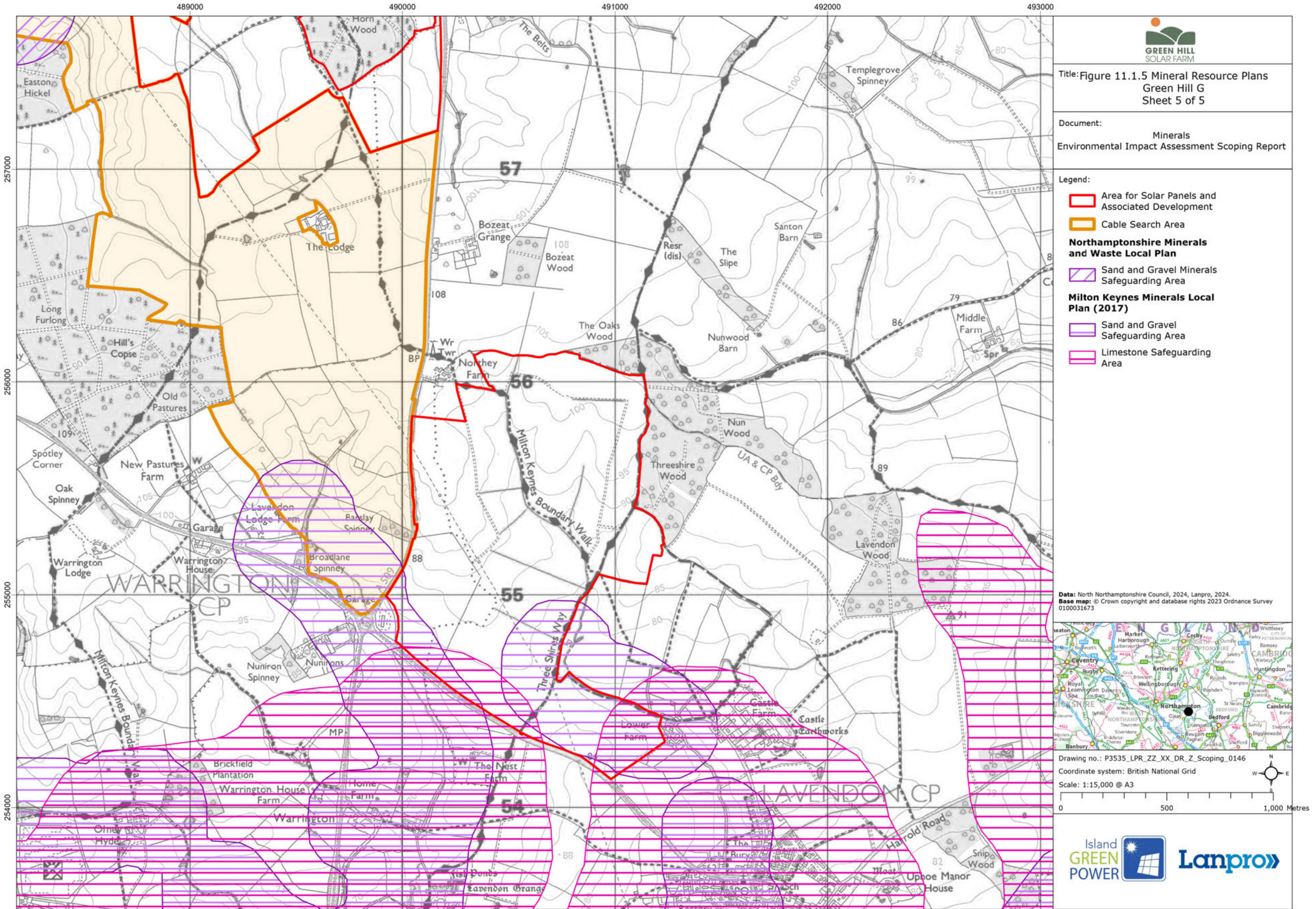
- Legend:
- Area for Solar Panels and Associated Development
 - Cable Search Area
 - Northamptonshire Minerals and Waste Local Plan**
 - Mineral Allocations
 - Sand and Gravel Minerals Safeguarding Area
 - Permitted Mineral Area
 - Milton Keynes Minerals Local Plan (2017)**
 - Sand and Gravel Safeguarding Area
 - Limestone Safeguarding Area

Data: North Northamptonshire Council, 2024, Lanpro, 2024.
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Green Hill Solar Farm

EIA Scoping Report

Appendix 12: Cultural Heritage

Revision A

Prepared by: Lanpro Services

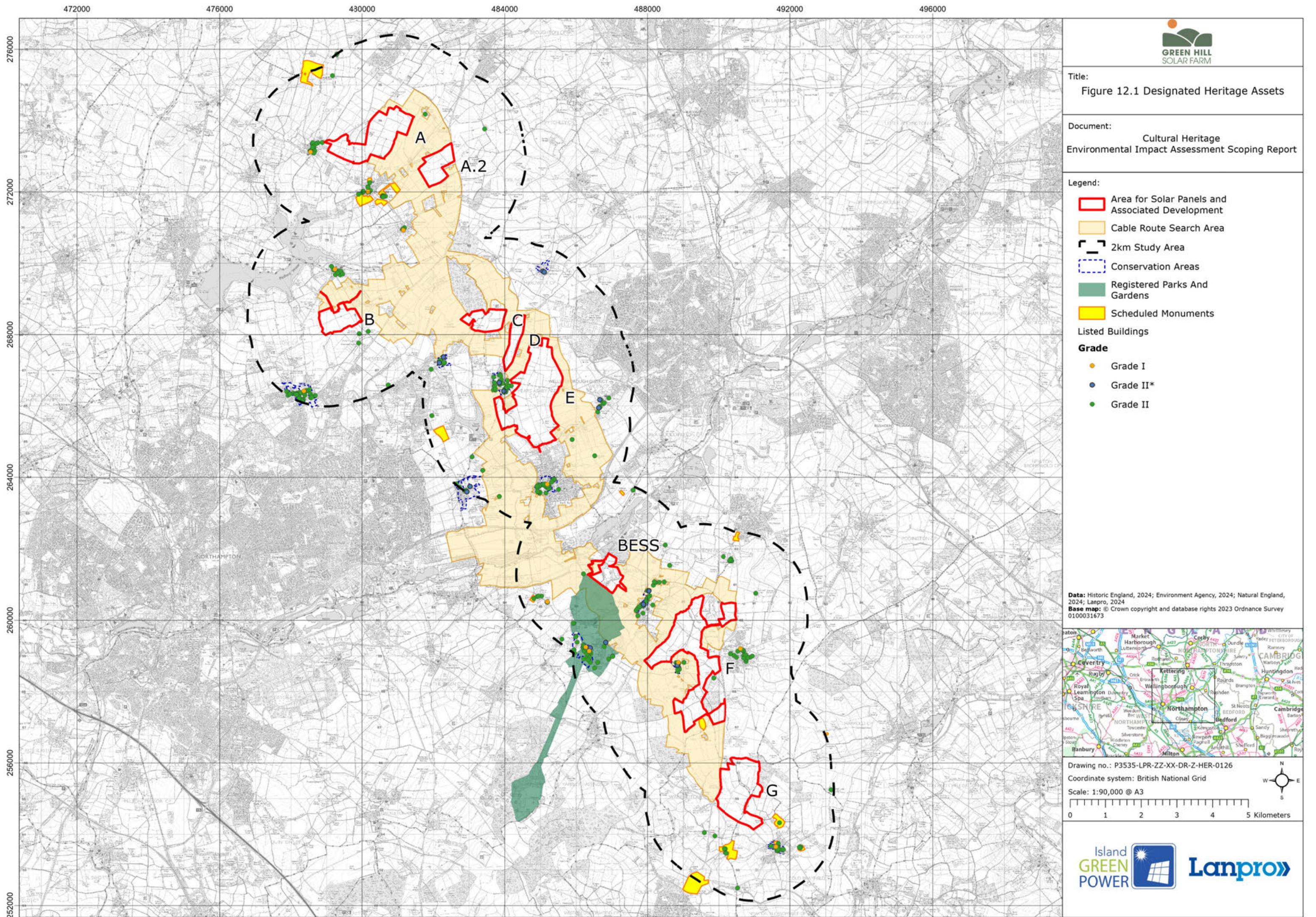
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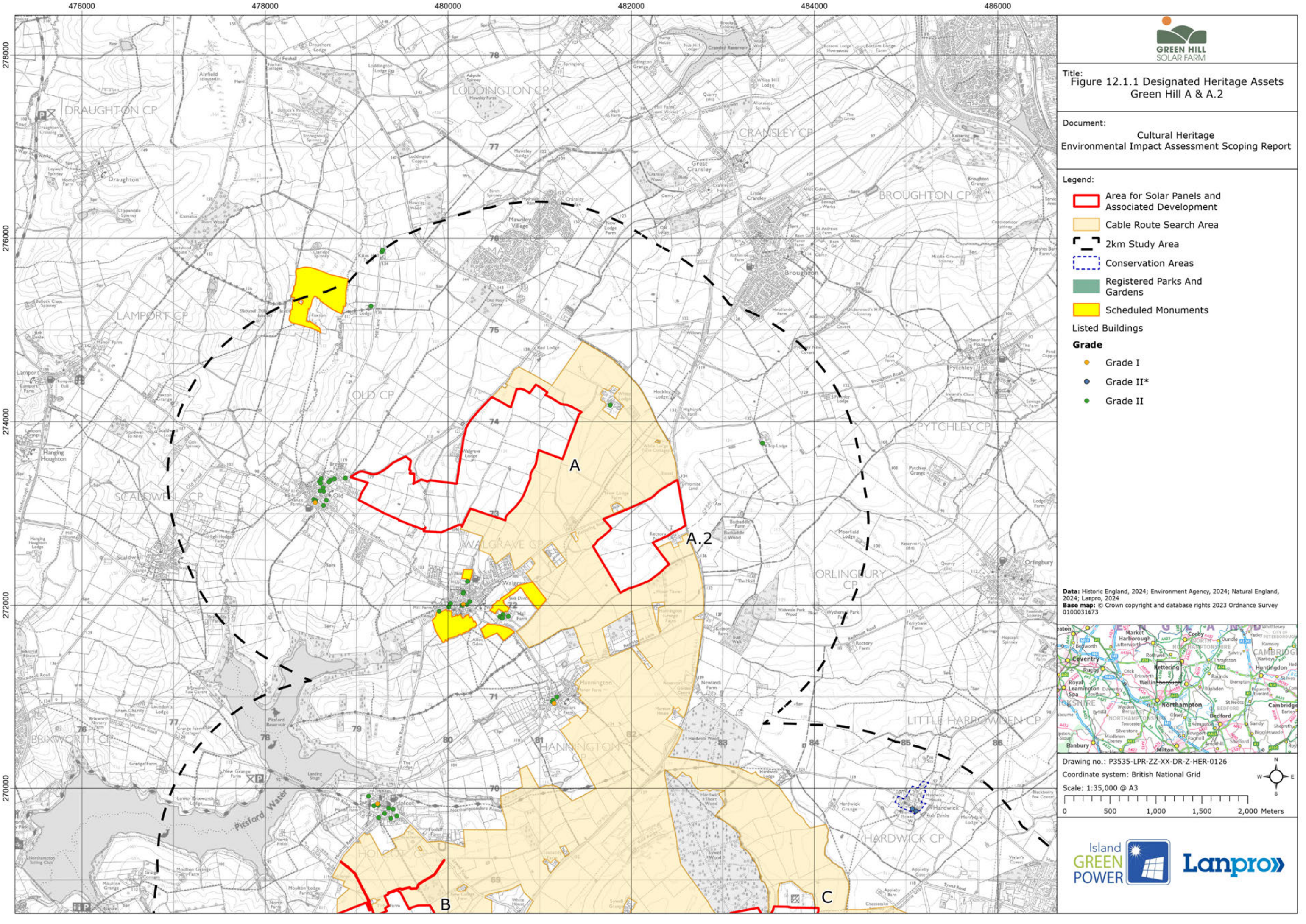
PINS reference: EN010170



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12.2.5	Non Designated Heritage Assets Green Hill G





Title:
Figure 12.1.1 Designated Heritage Assets
Green Hill A & A.2

Document:
Cultural Heritage
Environmental Impact Assessment Scoping Report

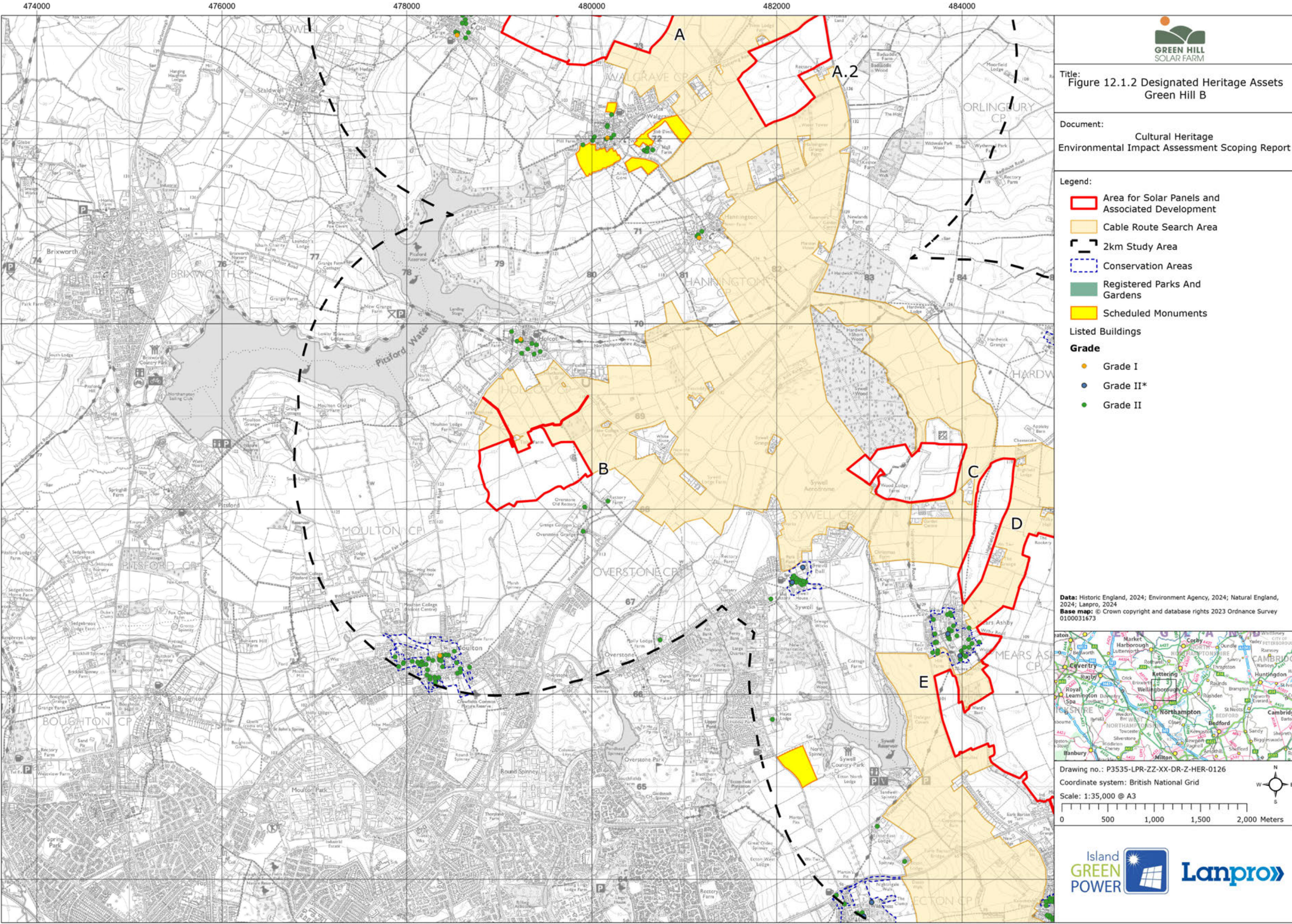
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- Area for Solar Panels and Associated Development
 - Cable Route Search Area
 - 2km Study Area
 - Conservation Areas
 - Registered Parks And Gardens
 - Scheduled Monuments
- Listed Buildings
- Grade
- Grade I
 - Grade II*
 - Grade II

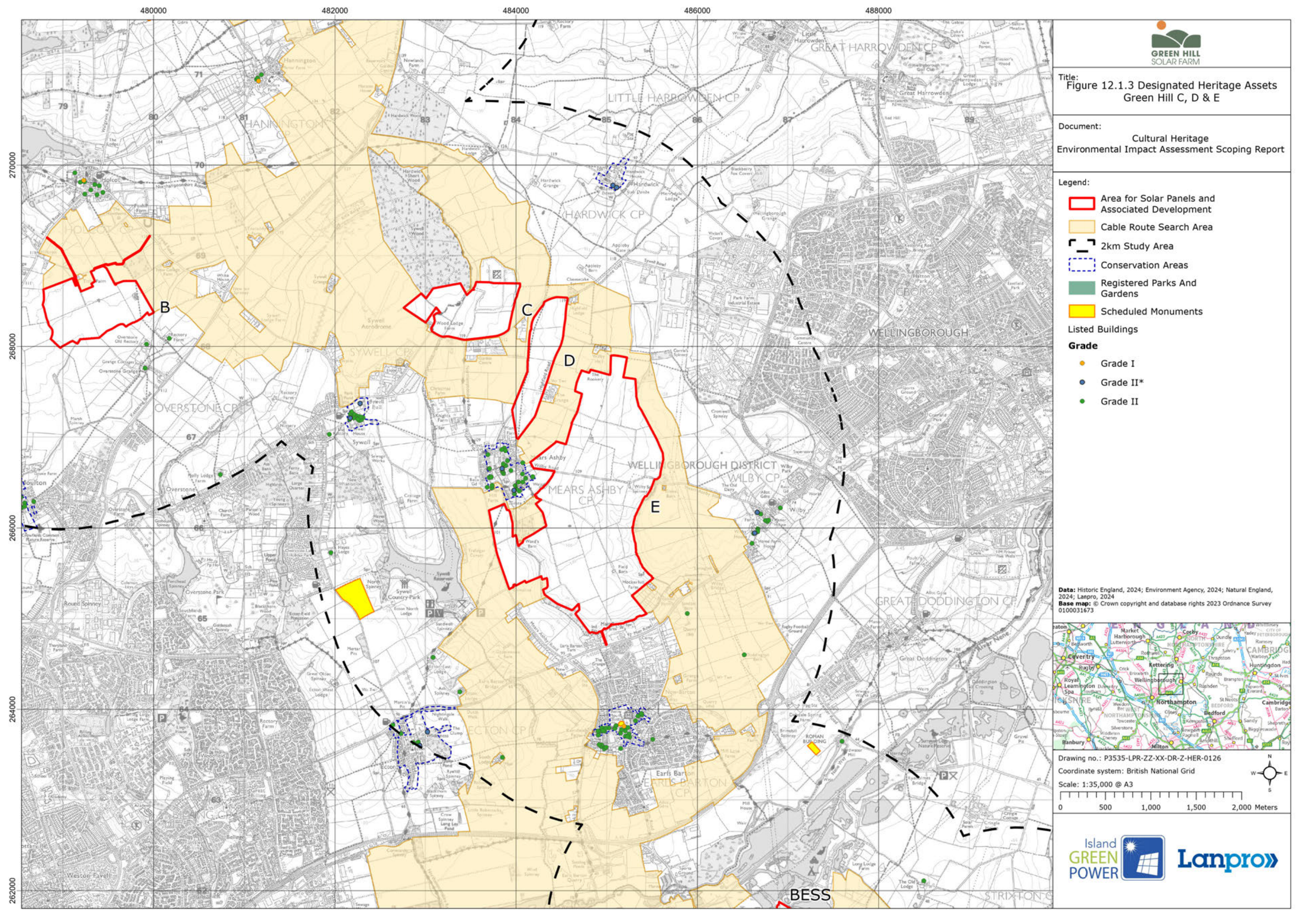
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Coordinate system: British National Grid
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0 500 1,000 1,500 2,000 Meters







Title:
Figure 12.1.3 Designated Heritage Assets
Green Hill C, D & E

Document:
Cultural Heritage
Environmental Impact Assessment Scoping Report

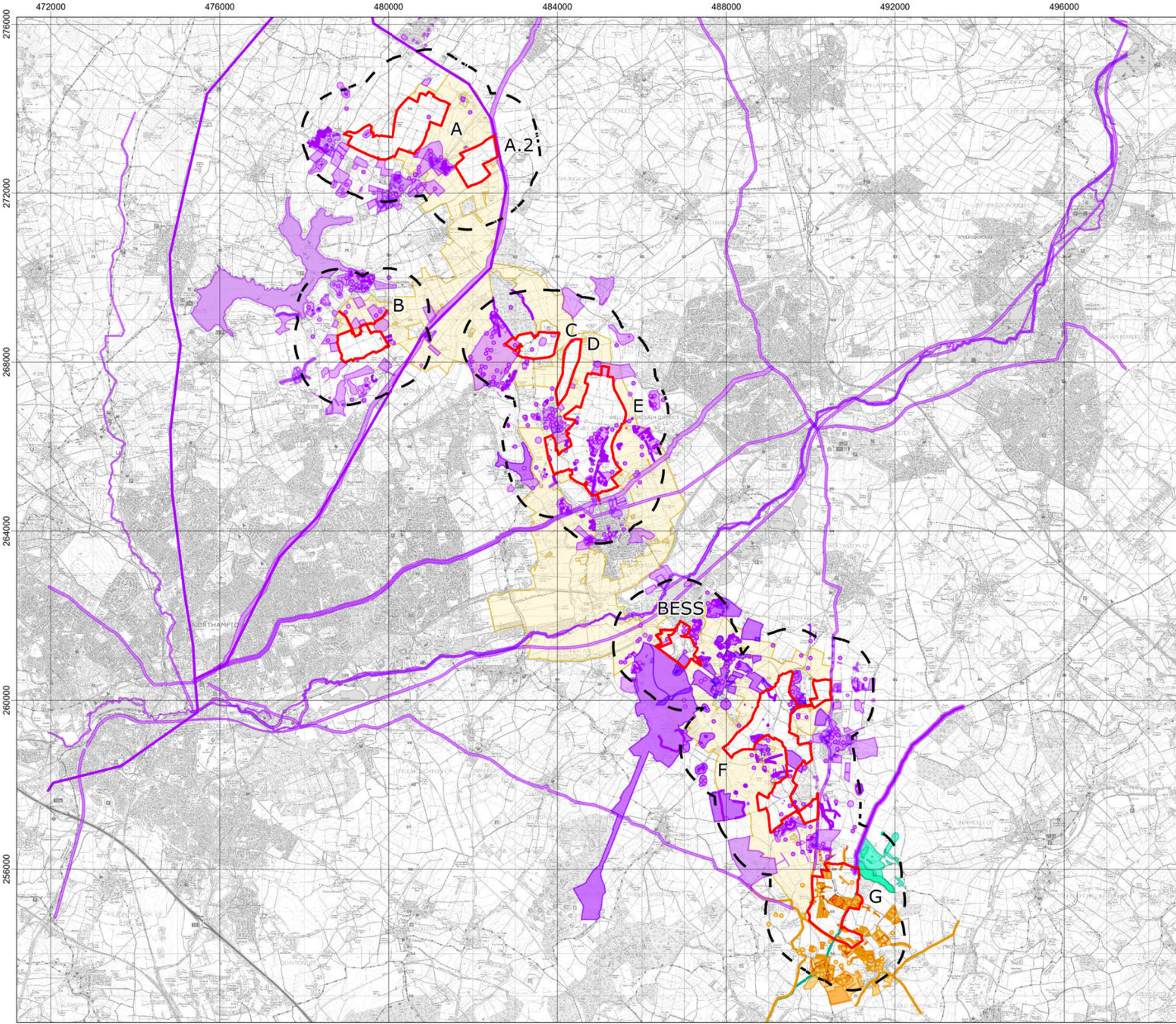
- Legend:
- Area for Solar Panels and Associated Development
 - Cable Route Search Area
 - 2km Study Area
 - Conservation Areas
 - Registered Parks And Gardens
 - Scheduled Monuments
- Listed Buildings
- Grade
- Grade I
 - Grade II*
 - Grade II

Data: Historic England, 2024; Environment Agency, 2024; Natural England, 2024; Lanpro, 2024
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Drawing no.: P3535-LPR-ZZ-XX-DR-Z-HER-0126
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Title: Figure 12.2 Non-Designated Heritage Assets

Document: Cultural Heritage Environmental Impact Assessment Scoping Report

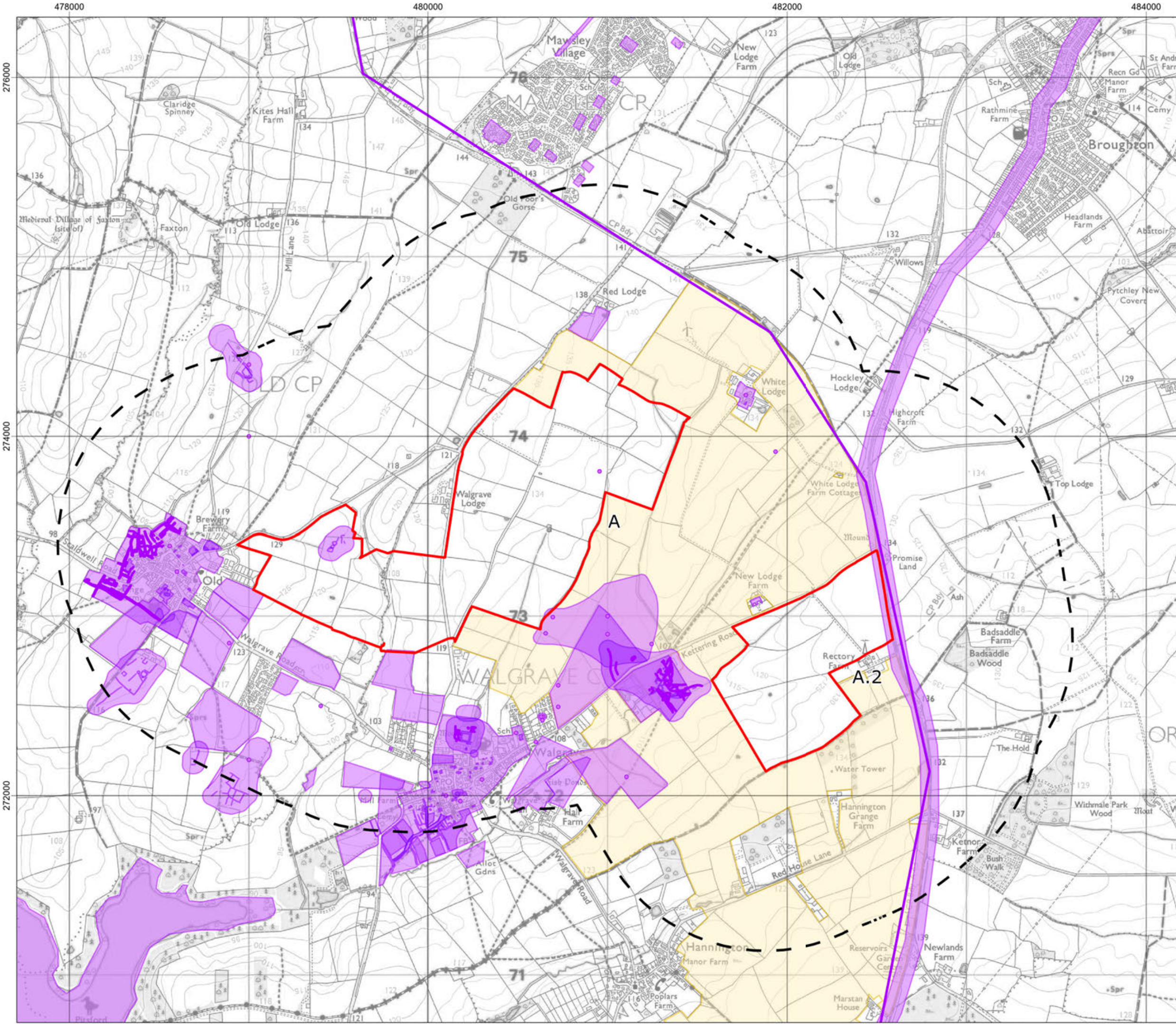
- Legend:
- Area for Solar Panels and Associated Development
 - Cable Route Search Area
 - 1km Study Area
 - Northamptonshire Monuments Point
 - Northamptonshire Monuments Line
 - Northamptonshire Monuments Polygon
 - Milton Keynes Monument Point
 - Milton Keynes Monument Line
 - Milton Keynes Monument Polygon
 - Bedford Borough Monuments Point
 - Bedford Borough Monuments Polygon
 - Bedford Borough Monument Line

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Drawing no.: P3535-LPR-ZZ-XX-DR-Z-HER-0126
Coordinate system: British National Grid
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0 1 2 3 4 Kilometers





Title: Figure 12.2.1 Non-Designated Heritage Assets
Green Hill A & A.2

Document:
Cultural Heritage
Environmental Impact Assessment Scoping Report

- Legend:
- Area for Solar Panels and Associated Development
 - Cable Route Search Area
 - 1km Study Area
 - Northamptonshire Monuments Point
 - Northamptonshire Monuments Line
 - Northamptonshire Monuments Polygon

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Drawing no.: P3535-LPR-ZZ-XX-DR-Z-HER-0126
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478000

480000







482000



Title: Figure 12.2.2 Non-Designated Heritage Assets
Green Hill B

Document:
Cultural Heritage
Environmental Impact Assessment Scoping Report

Legend:

-  Area for Solar Panels and Associated Development
-  Cable Route Search Area
-  1km Study Area
-  Northamptonshire Monuments Point
-  Northamptonshire Monuments Line
-  Northamptonshire Monuments Polygon

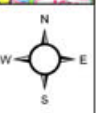
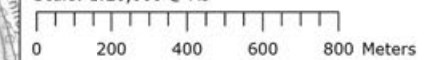
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Base map: © Crown copyright and database rights 2023 Ordnance Survey 0100031673



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Scale: 1:20,000 @ A3



482000

484000


486000



Title: Figure 12.2.3 Non-Designated Heritage Assets
Green Hill C, D & E

Document:
Cultural Heritage
Environmental Impact Assessment Scoping Report

Legend:

-  Area for Solar Panels and Associated Development
-  Cable Route Search Area
-  1km Study Area
-  Northamptonshire Monuments Point
-  Northamptonshire Monuments Line
-  Northamptonshire Monuments Polygon

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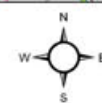


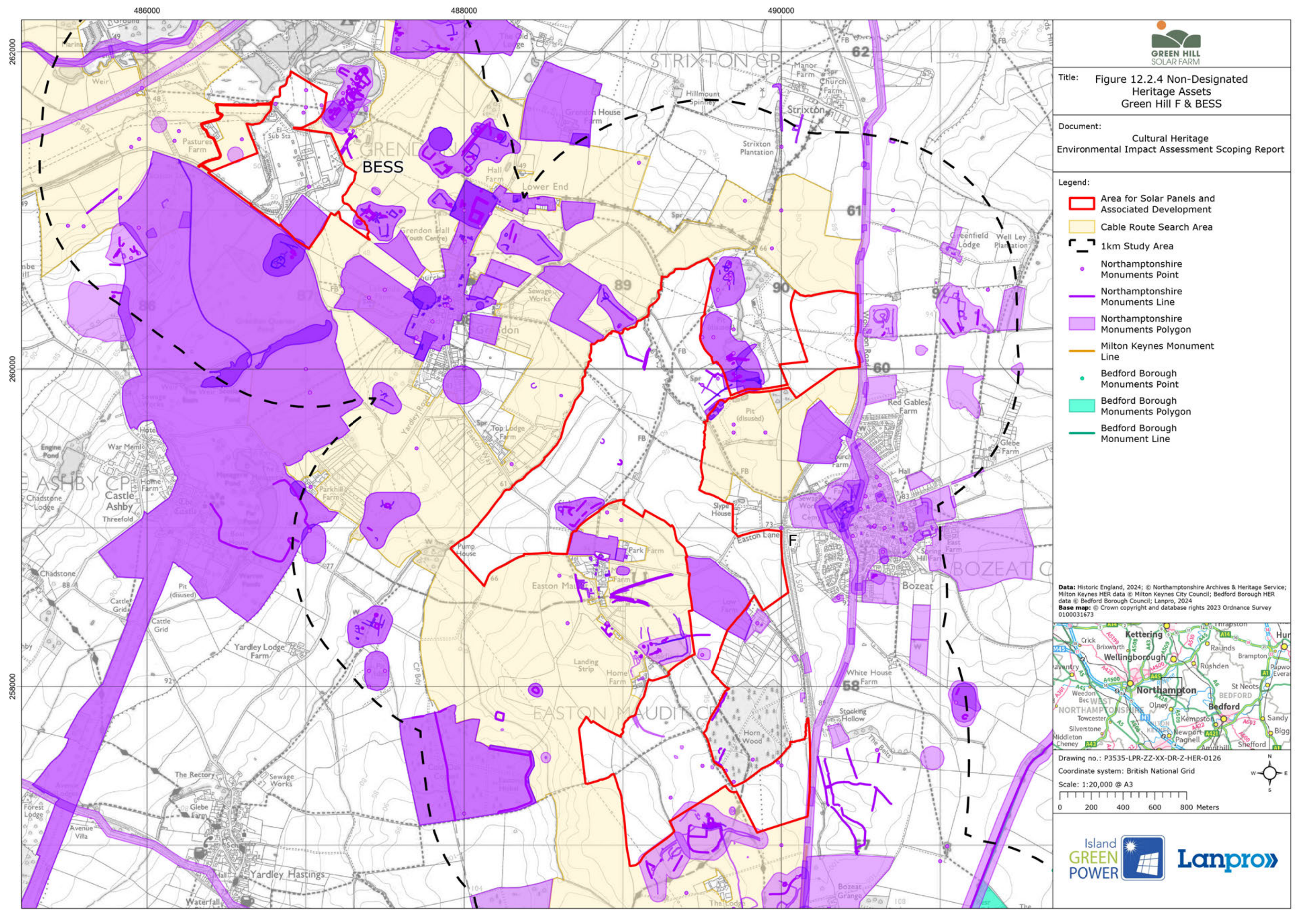
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0 200 400 600 800 Meters





Title: Figure 12.2.4 Non-Designated Heritage Assets
Green Hill F & BESS

Document:
Cultural Heritage
Environmental Impact Assessment Scoping Report

Legend:

- Area for Solar Panels and Associated Development
- Cable Route Search Area
- 1km Study Area
- Northamptonshire Monuments Point
- Northamptonshire Monuments Line
- Northamptonshire Monuments Polygon
- Milton Keynes Monument Line
- Bedford Borough Monuments Point
- Bedford Borough Monuments Polygon
- Bedford Borough Monument Line

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Green Hill Solar Farm

EIA Scoping Report

Appendix 14: Noise and Vibration

Revision A

Prepared by: TetraTech

Date: July 2024

PINS reference: EN010170



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14 Baseline Environmental Noise Survey

14.1 Monitoring Locations

14.1.1 Figures 1 to 5 present the monitoring locations.

Figure 1 Monitoring Locations Site A

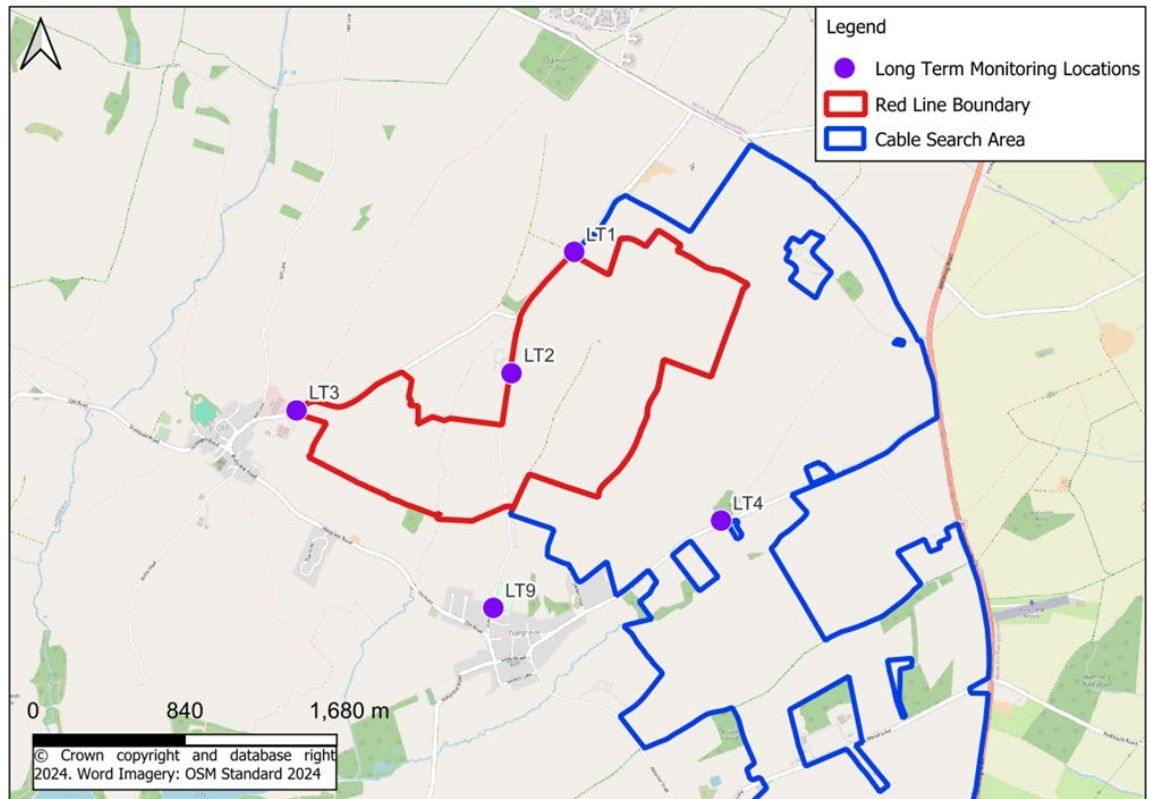




Figure 2 Monitoring Locations Site B

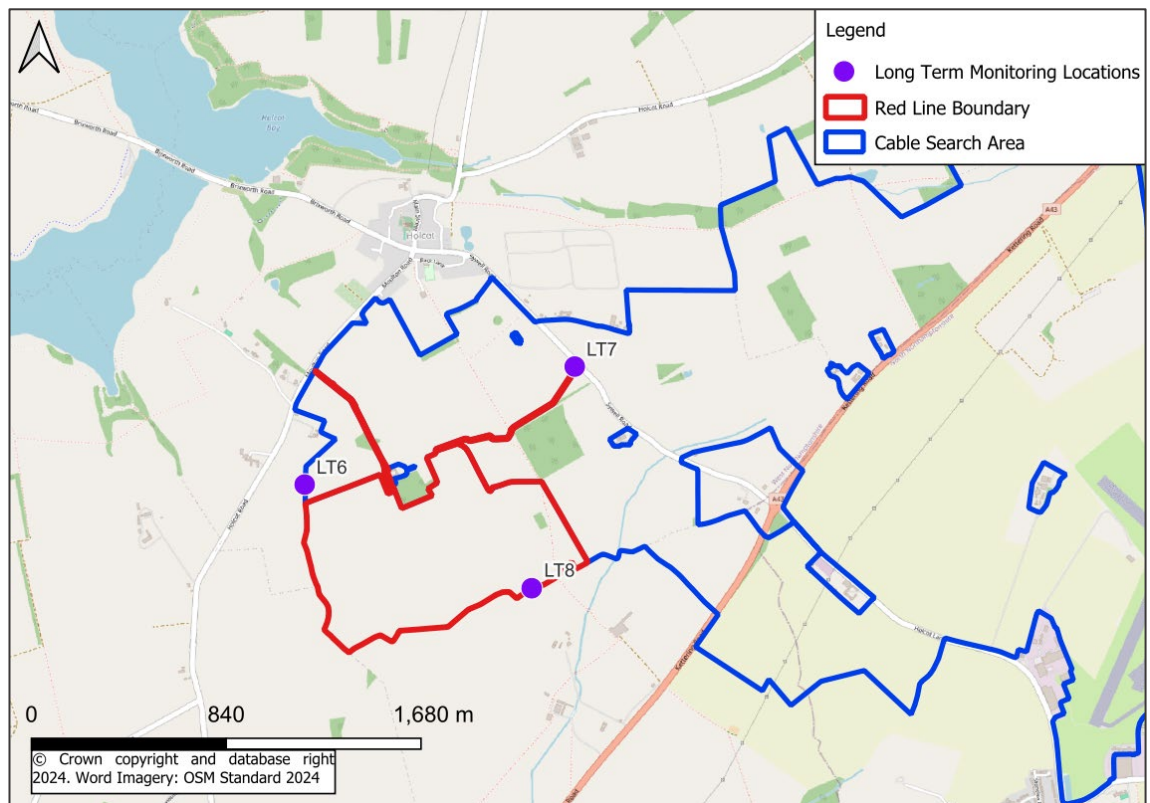


Figure 3 Monitoring Locations Sites C to E

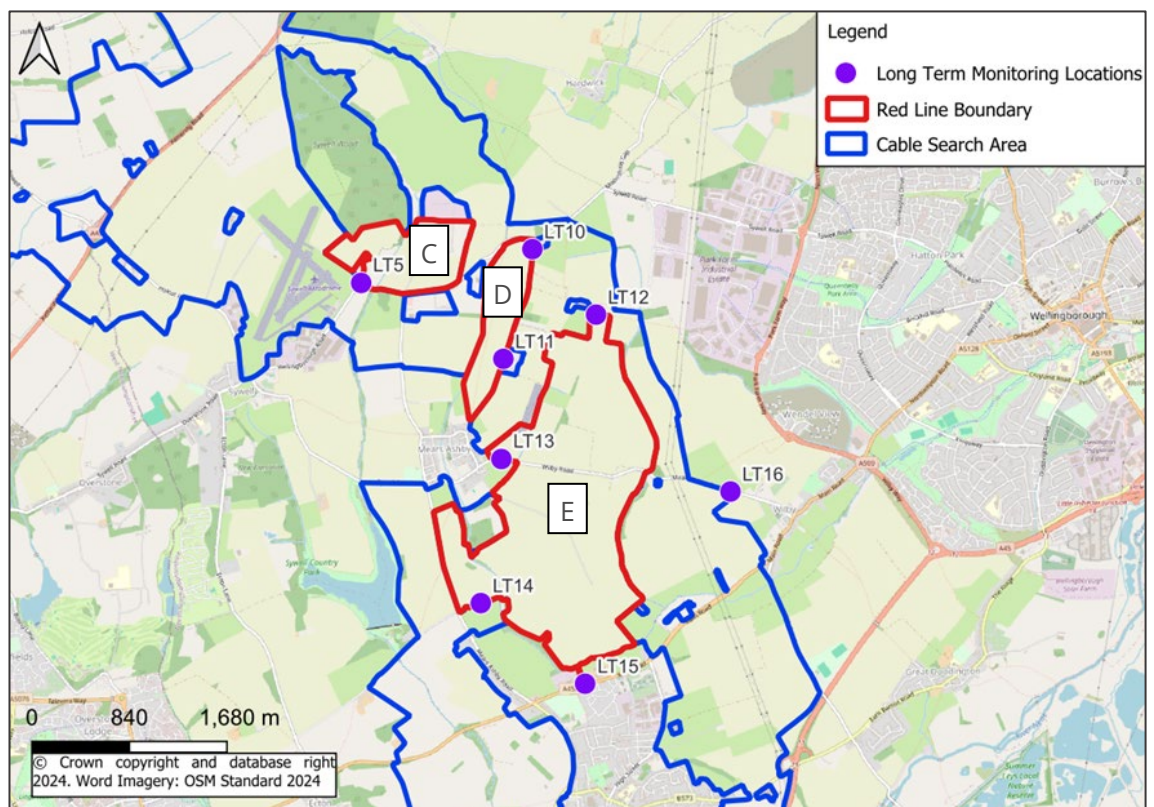




Figure 4 Monitoring Locations Site F and BESS Site

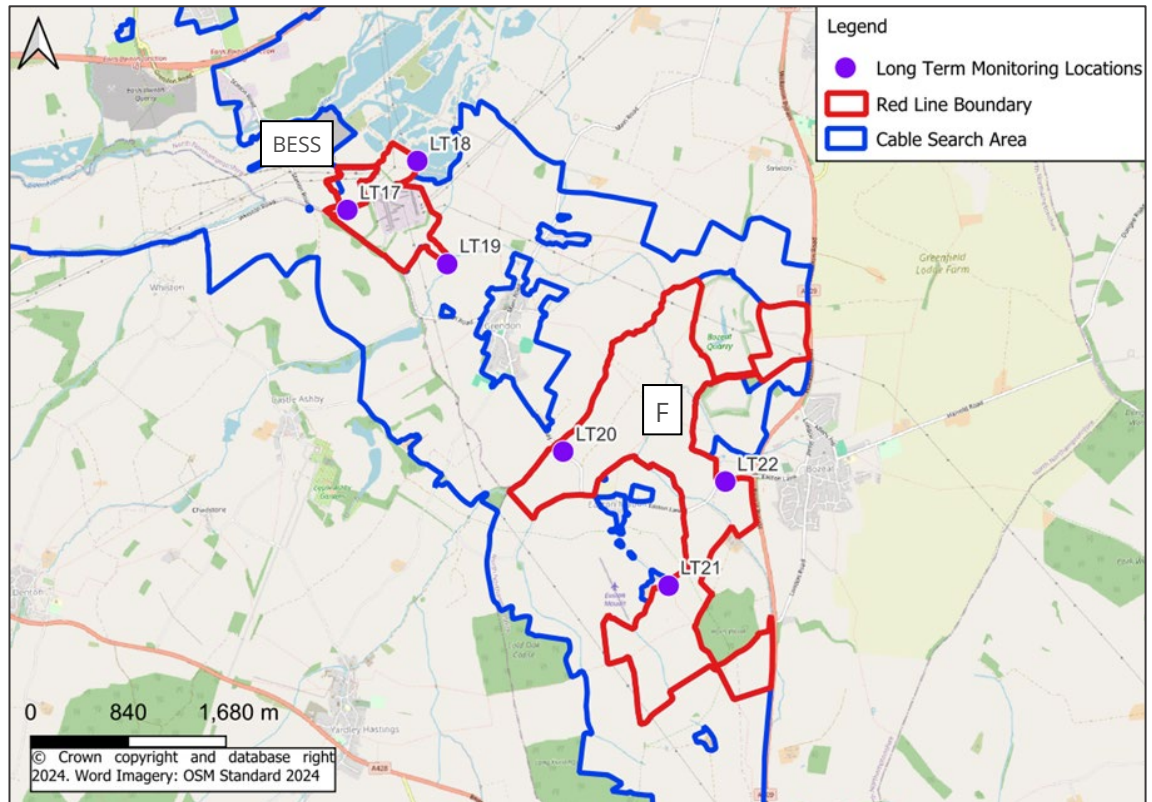
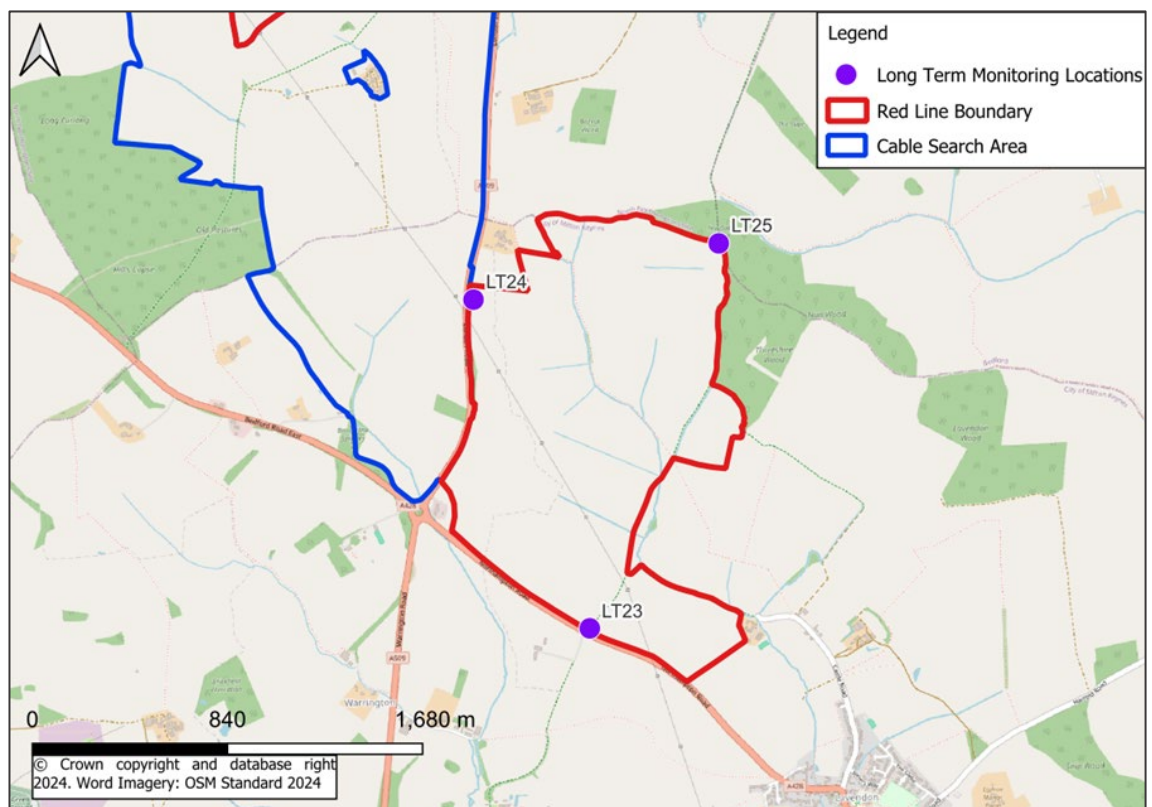


Figure 5 Monitoring Locations Site G





14.2 Noise Survey Results

14.2.1 The results of the noise measurements for monitoring positions LT1 - LT25 are presented in Table 1.

Table 1: Noise Survey Results

Period	Monitoring Date and Times	Location	LAeq,T	Period	Monitoring Date and Times	Location	LAeq,T
Weekday Daytime 07:00 - 23:00	21/09/2023 – 28/09/2023	LT1	66.2	103.3	18.2	62.3	36.0
Weekday Night-time 23:00 – 07:00	21/09/2023 – 28/09/2023		56.5	90.9	17.4	39.8	20.0
Weekend Daytime 07:00 - 23:00	23/09/2023 – 24/09/2023		64.4	102.2	21.6	60.9	32.0
Weekend Night-time 23:00 – 07:00	23/09/2023 – 25/09/2023		56.0	89.1	21.0	49.4	34.0
Weekday Daytime 07:00 - 23:00	28/09/2023 – 3/10/2023	LT2	51.5	96.4	20.7	47.6	42.0
Weekday Night-time 23:00 – 07:00	28/09/2023 – 3/10/2023		38.6	73.3	19.4	34.6	32.0
Weekend Daytime 07:00 - 23:00	30/09/2023 – 1/10/2023		49.7	88.1	20.2	44.1	29.0
Weekend Night-time 23:00 – 07:00	30/09/2023 – 2/10/2023		36.6	69.1	18.2	33.9	36.0
Weekday Daytime 07:00 - 23:00	21/09/2023 – 22/09/2023	LT3	60.3	91.0	22.9	57.7	38.0



Period	Monitoring Date and Times	Location	LAeq,T	Period	Monitoring Date and Times	Location	LAeq,T
Weekday Night-time 23:00 – 07:00	21/09/2023 – 23/09/2023		51.3	82.5	20.7	37.1	24.0
Weekend Daytime 07:00 – 23:00	23/09/2023 – 24/09/2023		58.6	90.5	23.0	55.9	32.0
Weekend Night-time 23:00 – 07:00	23/09/2023 – 24/09/2023		46.8	80.6	28.4	44.3	33.0
Weekday Daytime 07:00 – 23:00	21/09/2023 – 27/09/2023	LT4	63.0	96.9	21.8	59.5	40.0
Weekday Night-time 23:00 – 07:00	21/09/2023 – 27/09/2023		51.4	85.4	17.0	36.6	24.0
Weekend Daytime 07:00 – 23:00	23/09/2023 – 24/09/2023		60.3	85.3	26.8	56.6	32.0
Weekend Night-time 23:00 – 07:00	23/09/2023 – 25/09/2023		50.1	84.5	22.6	44.4	32.0
Weekday Daytime 07:00 – 23:00	21/09/2023 – 27/09/2023	LT5	57.1	89.0	22.8	56.4	54.0
Weekday Night-time 23:00 – 07:00	21/09/2023 – 27/09/2023		47.6	82.0	20.1	42.3	36.0
Weekend Daytime 07:00 – 23:00	23/09/2023 – 24/09/2023		62.0	95.8	36.7	62.1	42.0



Period	Monitoring Date and Times	Location	LAeq,T	Period	Monitoring Date and Times	Location	LAeq,T
Weekend Night-time 23:00 – 07:00	23/09/2023 – 25/09/2023		49.7	76.2	29.9	50.7	38.0
Weekday Daytime 07:00 – 23:00	28/09/2023 – 3/10/2023	LT6	49.8	78.6	21.0	49.2	39.0
Weekday Night-time 23:00 – 07:00	28/09/2023 – 3/10/2023		42.3	73.0	17.5	40.5	40.0
Weekend Daytime 07:00 – 23:00	30/09/2023 – 1/10/2023		43.7	82.5	23.8	45.4	31.0
Weekend Night-time 23:00 – 07:00	30/09/2023 – 2/10/2023		39.6	69.9	18.1	38.0	36.0
Weekday Daytime 07:00 – 23:00	21/09/2023 – 28/09/2023	LT7	62.5	92.0	24.5	65.9	51.0
Weekday Night-time 23:00 – 07:00	21/09/2023 – 28/09/2023		54.6	80.8	16.6	48.0	24.0
Weekend Daytime 07:00 – 23:00	23/09/2023 – 24/09/2023		61.7	91.3	29.9	64.5	44.0
Weekend Night-time 23:00 – 07:00	23/09/2023 – 25/09/2023		52.9	86.2	24.1	47.7	34.0
Weekday Daytime 07:00 – 23:00	21/09/2023 – 28/09/2023	LT8	51.9	85.6	25.9	49.7	37.0



Period	Monitoring Date and Times	Location	LAeq,T	Period	Monitoring Date and Times	Location	LAeq,T
Weekday Night-time 23:00 – 07:00	21/09/2023 – 28/09/2023		49.6	74.6	18.4	43.6	34.0
Weekend Daytime 07:00 – 23:00	23/09/2023 – 24/09/2023		53.7	77.3	29.8	51.5	32.0
Weekend Night-time 23:00 – 07:00	23/09/2023 – 25/09/2023		50.4	69.9	28.4	51.0	40.0
Weekday Daytime 07:00 – 23:00	28/09/2023 – 3/10/2023	LT9	52.6	95.5	19.6	48.1	38.0
Weekday Night-time 23:00 – 07:00	28/09/2023 – 3/10/2023		41.2	70.9	16.9	36.8	41.0
Weekend Daytime 07:00 – 23:00	30/09/2023 – 1/10/2023		49.9	90.1	20.4	45.7	29.0
Weekend Night-time 23:00 – 07:00	30/09/2023 – 2/10/2023		40.0	73.0	17.1	36.7	36.0
Weekday Daytime 07:00 – 23:00	28/09/2023 – 3/10/2023	LT10	55.8	91.6	24.2	54.7	44.0
Weekday Night-time 23:00 – 07:00	28/09/2023 – 3/10/2023		46.9	88.3	21.1	43.1	32.0
Weekend Daytime 07:00 – 23:00	30/09/2023 – 1/10/2023		53.5	89.5	23.4	51.4	35.0



Period	Monitoring Date and Times	Location	LAeq,T	Period	Monitoring Date and Times	Location	LAeq,T
Weekend Night-time 23:00 – 07:00	30/09/2023 – 2/10/2023		46.7	88.6	18.5	42.7	36.0
Weekday Daytime 07:00 – 23:00	3/10/2023 – 10/10/2023	LT11	53.6	94.3	24.3	49.9	46.0
Weekday Night-time 23:00 – 07:00	3/10/2023 – 10/10/2023		43.0	76.8	20.3	37.8	30.0
Weekend Daytime 07:00 – 23:00	7/10/2023 – 8/10/2023		52.8	83.8	24.1	47.1	36.0
Weekend Night-time 23:00 – 07:00	7/10/2023 – 9/10/2023		41.8	77.7	20.1	33.7	31.0
Weekday Daytime 07:00 – 23:00	28/09/2023 – 29/09/2023	LT12	44.0	74.9	22.1	43.5	36.0
Weekday Night-time 23:00 – 07:00	28/09/2023 – 30/09/2023		36.1	68.5	21.1	35.3	39.0
Weekend Daytime 07:00 – 23:00	30/09/2023 – 1/10/2023		43.3	83.2	26.1	44.5	30.0
Weekend Night-time 23:00 – 07:00	30/09/2023 – 1/10/2023		42.9	66.7	29.2	44.1	37.0
Weekday Daytime 07:00 – 23:00	28/09/2023 – 3/10/2023	LT13	59.0	95.9	25.4	58.1	37.0



Period	Monitoring Date and Times	Location	LAeq,T	Period	Monitoring Date and Times	Location	LAeq,T
Weekday Night-time 23:00 – 07:00	28/09/2023 – 3/10/2023		48.9	79.2	20.6	37.5	31.0
Weekend Daytime 07:00 – 23:00	30/09/2023 – 1/10/2023		57.5	93.0	25.0	55.0	32.0
Weekend Night-time 23:00 – 07:00	30/09/2023 – 2/10/2023		47.1	75.8	19.8	36.1	34.0
Weekday Daytime 07:00 – 23:00	3/10/2023 – 10/10/2023	LT14	45.6	76.0	27.1	46.5	41.0
Weekday Night-time 23:00 – 07:00	3/10/2023 – 10/10/2023		38.5	83.4	22.4	38.5	34.0
Weekend Daytime 07:00 – 23:00	7/10/2023 – 8/10/2023		43.6	72.8	27.3	44.7	39.0
Weekend Night-time 23:00 – 07:00	7/10/2023 – 9/10/2023		37.3	70.0	22.5	35.6	34.0
Weekday Daytime 07:00 – 23:00	3/10/2023 – 10/10/2023	LT15	62.4	97.7	28.8	65.9	48.0
Weekday Night-time 23:00 – 07:00	3/10/2023 – 10/10/2023		54.3	89.4	23.7	48.6	35.0
Weekend Daytime 07:00 – 23:00	7/10/2023 – 8/10/2023		60.7	97.4	30.5	64.1	41.0



Period	Monitoring Date and Times	Location	LAeq,T	Period	Monitoring Date and Times	Location	LAeq,T
Weekend Night-time 23:00 – 07:00	7/10/2023 – 9/10/2023		53.5	82.4	22.5	47.9	37.0
Weekday Daytime 07:00 – 23:00	28/09/2023 – 3/10/2023	LT16	62.0	102.9	26.3	59.1	42.0
Weekday Night-time 23:00 – 07:00	28/09/2023 – 3/10/2023		52.8	87.4	19.7	42.0	37.0
Weekend Daytime 07:00 – 23:00	30/09/2023 – 1/10/2023		60.7	102.7	25.4	55.5	33.0
Weekend Night-time 23:00 – 07:00	30/09/2023 – 2/10/2023		50.6	82.1	19.6	40.2	38.0
Weekday Daytime 07:00 – 23:00	30/09/2023 – 3/10/2023	LT17	48.3	78.0	27.0	49.8	39.0
Weekday Night-time 23:00 – 07:00	30/09/2023 – 3/10/2023		42.5	74.9	25.6	42.1	34.0
Weekend Daytime 07:00 – 23:00	30/09/2023 – 1/10/2023		46.6	72.6	26.7	49.1	41.0
Weekend Night-time 23:00 – 07:00	30/09/2023 – 2/10/2023		40.5	75.9	22.6	37.0	37.0
Weekday Daytime 07:00 – 23:00	3/10/2023 – 10/10/2023	LT18	47.3	77.0	29.9	47.0	46.0



Period	Monitoring Date and Times	Location	LAeq,T	Period	Monitoring Date and Times	Location	LAeq,T
Weekday Night-time 23:00 – 07:00	3/10/2023 – 10/10/2023		41.5	79.4	29.6	41.5	37.0
Weekend Daytime 07:00 – 23:00	7/10/2023 – 8/10/2023		44.4	75.8	33.1	44.9	42.0
Weekend Night-time 23:00 – 07:00	7/10/2023 – 9/10/2023		40.8	73.1	29.1	41.3	38.0
Weekday Daytime 07:00 – 23:00	28/09/2023 – 3/10/2023	LT19	42.5	83.2	25.7	42.9	36.0
Weekday Night-time 23:00 – 07:00	28/09/2023 – 3/10/2023		38.1	58.4	22.9	38.3	28.0
Weekend Daytime 07:00 – 23:00	30/09/2023 – 1/10/2023		39.9	70.5	25.8	41.6	36.0
Weekend Night-time 23:00 – 07:00	30/09/2023 – 2/10/2023		35.5	68.3	23.0	34.5	35.0
Weekday Daytime 07:00 – 23:00	20/02/2024 – 27/02/2024	LT20	57.0	93.3	34.4	54.2	38.0
Weekday Night-time 23:00 – 07:00	20/02/2024 – 27/02/2024		49.7	87.3	33.6	44.1	36.0
Weekend Daytime 07:00 – 23:00	24/02/2024 – 25/02/2024		55.4	86.8	32.8	51.9	36.0



Period	Monitoring Date and Times	Location	LAeq,T	Period	Monitoring Date and Times	Location	LAeq,T
Weekend Night-time 23:00 – 07:00	24/02/2024 – 25/02/2024		46.2	79.0	34.0	39.7	35.0
Weekday Daytime 07:00 – 23:00	20/02/2024 – 23/02/2024	LT21	49.4	94.6	32.4	47.7	38.0
Weekday Night-time 23:00 – 07:00	20/02/2024 – 23/02/2024		43.8	78.8	29.7	43.8	40.0
Weekend Daytime 07:00 – 23:00	24/02/2024		43.7	82.7	30.6	41.0	33.0
Weekend Night-time 23:00 – 07:00	24/02/2024 – 25/02/2024		36.9	68.6	28.2	36.8	35.0
Weekday Daytime 07:00 – 23:00	20/02/2024 – 27/02/2024	LT22	56.3	89.2	27.6	56.0	42.0
Weekday Night-time 23:00 – 07:00	20/02/2024 – 27/02/2024		48.9	85.3	20.5	47.6	39.0
Weekend Daytime 07:00 – 23:00	24/02/2024 – 25/02/2024		54.7	90.8	25.7	54.6	38.0
Weekend Night-time 23:00 – 07:00	24/02/2024 – 25/02/2024		45.0	73.5	20.5	44.6	28.0
Weekday Daytime 07:00 – 23:00	08/05/2024 – 11/05/2024	LT23	63.5	102.7	23.8	67.0	42.0



Period	Monitoring Date and Times	Location	LAeq,T	Period	Monitoring Date and Times	Location	LAeq,T
Weekday Night-time 23:00 – 07:00	08/05/2024 – 11/05/2024		58.1	89.5	18.8	56.1	26.0
Weekend Daytime 07:00 – 23:00	08/05/2024 – 11/05/2024		63.1	94.5	30.8	66.8	44.0
Weekend Night-time 23:00 – 07:00	08/05/2024 – 11/05/2024		55.4	84.7	18.7	52.6	22.0
Weekday Daytime 07:00 – 23:00	08/05/2024 – 14/05/2024	LT24	65.4	101.2	25.4	69.0	42.0
Weekday Night-time 23:00 – 07:00	08/05/2024 – 14/05/2024		60.4	89.5	20.7	55.9	32.0
Weekend Daytime 07:00 – 23:00	08/05/2024 – 14/05/2024		64.0	93.0	26.8	68.2	44.0
Weekend Night-time 23:00 – 07:00	08/05/2024 – 14/05/2024		57.5	87.7	21.4	55.2	31.0
Weekday Daytime 07:00 – 23:00	08/05/2024 – 15/05/2024	LT25	50.5	89.1	19.2	49.1	38.0
Weekday Night-time 23:00 – 07:00	08/05/2024 – 15/05/2024		52.1	89.3	18.3	40.9	24.0
Weekend Daytime 07:00 – 23:00	08/05/2024 – 15/05/2024		53.3	86.0	21.6	51.4	36.0



Period	Monitoring Date and Times	Location	LAeq,T	Period	Monitoring Date and Times	Location	LAeq,T
Weekend Night-time 23:00 – 07:00	08/05/2024 – 15/05/2024		54.1	81.6	19.9	40.1	22.0

Green Hill Solar Farm

EIA Scoping Report

Appendix 15: Glint and Glare

Revision A

Prepared by: Mabbett & Associates

Date: July 2024

PINS reference: EN010170

Project No: 313532

Glint and Glare EIA Scoping Chapter Appendix

Prepared for:

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Contents Amendment Record

This report has been issued and amended as follows:

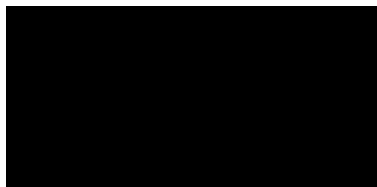
Revision	Description	Date	Signed
3.0	Third Issue	13 June 2024	A Clacy

Acknowledgement

This report has been prepared for the sole and exclusive use of Green Hill Solar Farm Limited. This report is based on information and data collected by Mabbett & Associates Ltd (Mabbett). Should any of the information be incorrect, incomplete or subject to change, Mabbett may wish to revise the report accordingly.

This report has been prepared by the following Mabbett personnel:

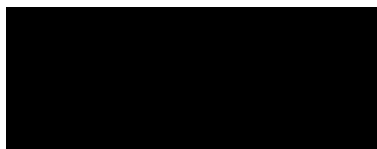
MABBETT & ASSOCIATES LTD



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Environmental Engineer

This report has been reviewed and approved by the following Mabbett personnel:

MABBETT & ASSOCIATES LTD



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Senior Environmental Consultant

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Section 1.0: Introduction

1.1 Background

Mabbett & Associates Ltd (Mabbett) has been appointed to provide glint and glare assessment services the proposed solar development, Green Hill, to be located near Northampton, England. A high-level receptor review has been undertaken to evaluate potential light-sensitive receptors which may be impacted by glint and glare from Green Hill Solar Farm which will be taken forward for the full technical glint and glare assessment (hereafter referred to as the Scheme).

1.2 Glint & Glare

Reflectivity refers to light that is reflected off surfaces (e.g. glazed surfaces or areas of metal cladding). The potential effects of reflectivity are glint and glare. The U.S. Federal Aviation Administration's (FAA) *'Technical Guidance for Evaluating Selected Solar Technologies on Airports'* provides the following glint and glare definitions:

- Glint – “a momentary flash of bright light”
- Glare – “a continuous source of bright light”

These present an ocular hazard to light sensitive receptors such as road users, train drivers, occupants of nearby dwellings, pilots, and air-traffic control personnel, as they can cause a brief, temporary or permanent eye damage (ocular impact categories and significance further discussed in Section 4.3).

In general, solar photovoltaic (PV) systems are constructed of dark, light-absorbing material designed to maximise light adsorption and minimise reflection. However, the glass surfaces of solar PV systems also reflect sunlight to varying degrees throughout the day and year, based on the incidence angle of the sun relative to ground-based receptors. Lower incidence angles amount to increased reflection.

As such, the amount of light reflected off a solar PV panel surface or an array of solar panels depends on:

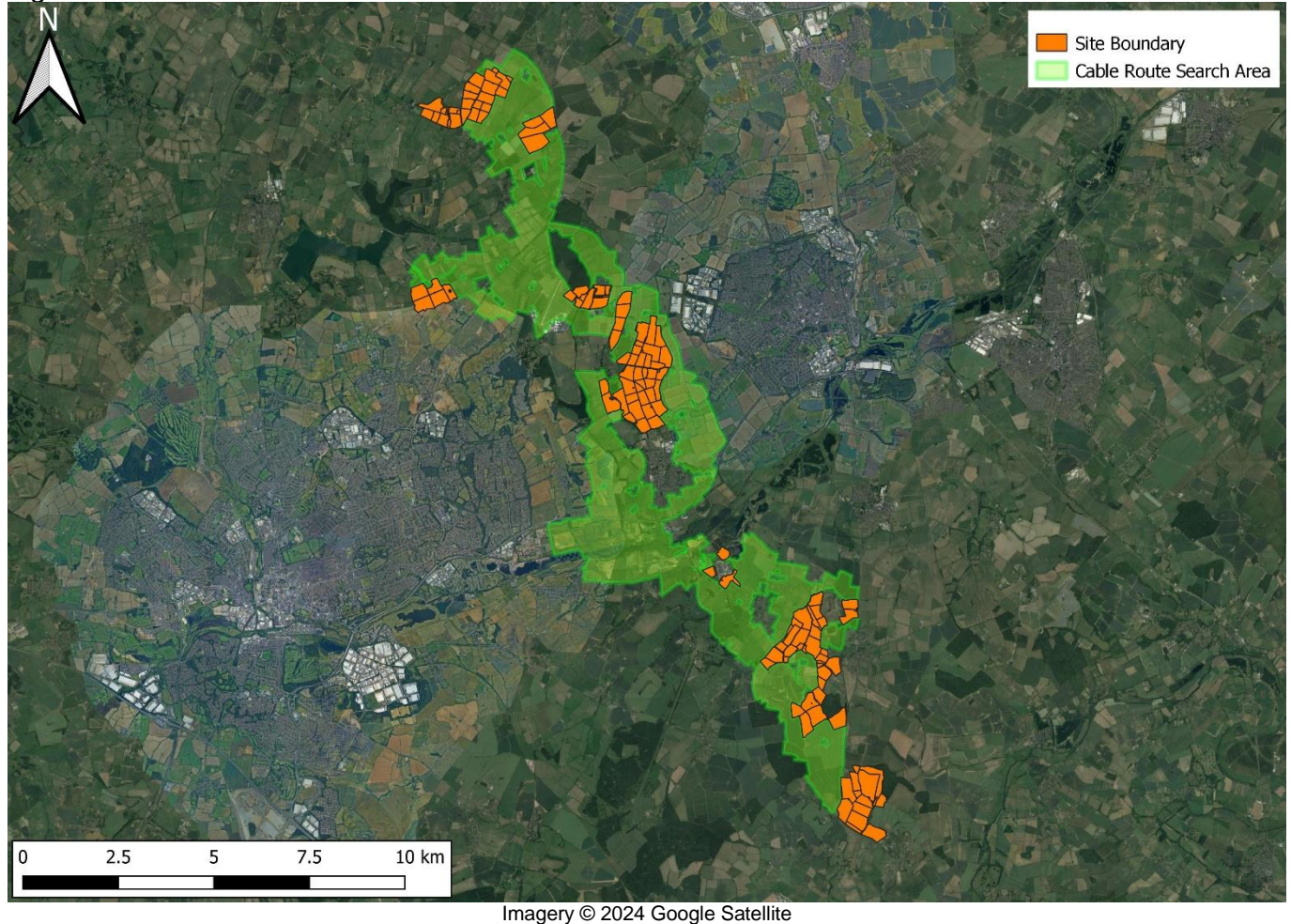
- The amount of sunlight hitting the surface;
- Its surface reflectivity;
- Its geographic location;
- Time of the year;
- Cloud coverage; and
- Panel orientation.

Section 2.0: Site Description & Scheme

2.1 Scheme

The site is situated on land north of Northampton and is made up of a disparate number of sites, as can be seen below in Figure 2.1.

Figure 2.1: Site Location



Green Hill Solar Farm is split into different areas. One area is for a Battery Energy Storage System (BESS) and will not include the installation of any solar arrays. Therefore, this area will not be relevant for a glint and glare assessment. Additionally, the Cable Route Search Area will not include the installation of any solar arrays, and as such, will not be relevant for a glint and glare assessment. An aerial view of the remaining areas (that will include solar panels) is shown below in Figure 2.2.

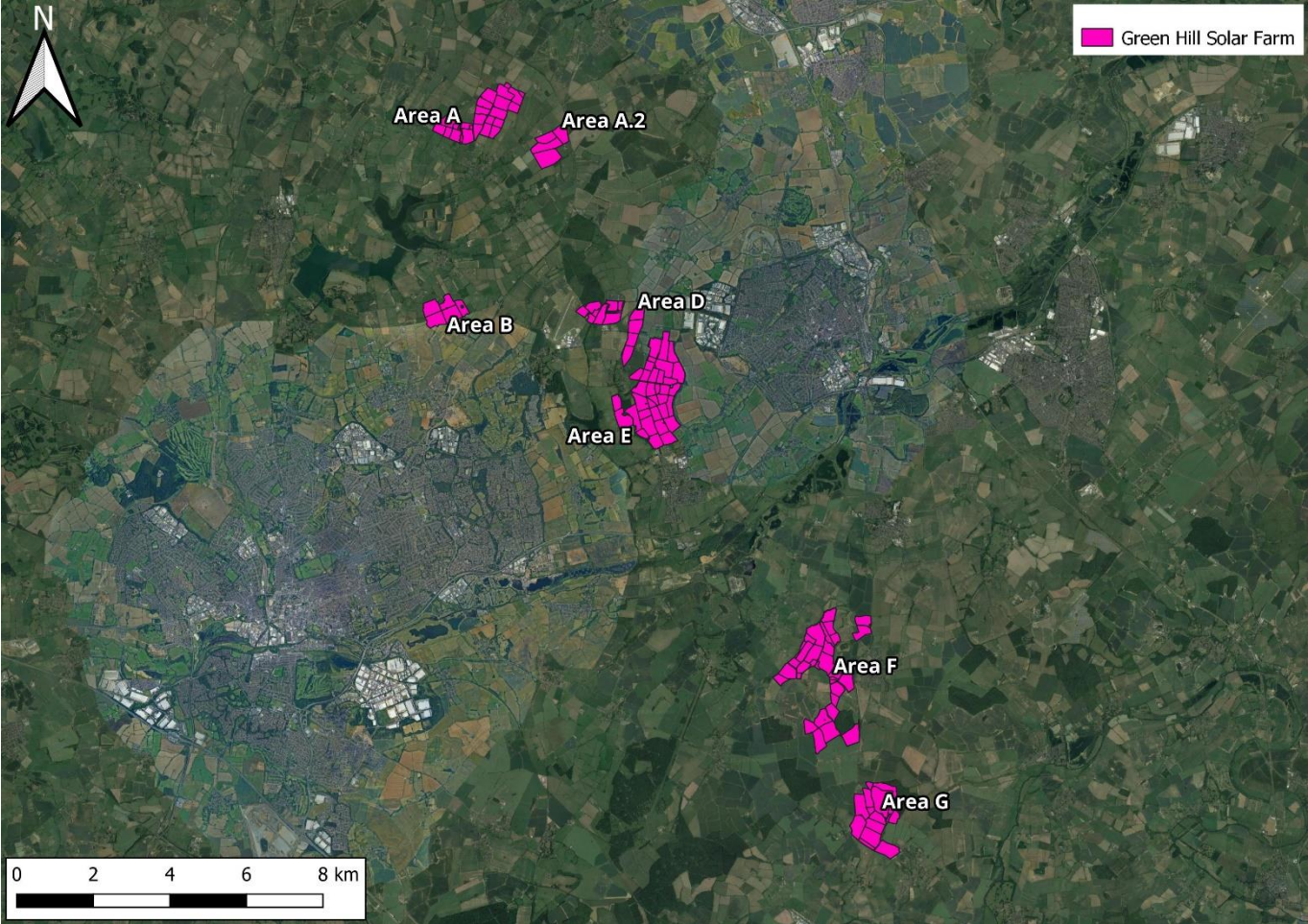
For the purpose of this study of this receptor review, Area C, Area D, and Area E have been assessed together to avoid overlapping and “double-counting” of some receptors.

It should be noted that early baseline conditions surveys for Site A.2, the potential extension of Site A, have not been completed prior to the submission of this Scoping Report. Due to its proximity to Site A, the baseline conditions for Site A.2 are assumed for the purpose of this Scoping Report to be equivalent to Site A. If Site A.2 is taken forward and included in the Scheme, the baseline conditions will be shared with key stakeholders and any differences from the Site A baseline identified, and will be presented in the PEIR for statutory consultation ahead of the submission of the completed ES as part of the future DCO submission.

Whilst the baseline conditions for Site A.2 are not yet available, due to its proximity to Site A, it is proposed that the assessment of likely significant environmental effects from Site A.2 is to be carried out in the same manner as for Site A. In the event any characteristics of Site A.2 are found to differ from the baseline for

Site A, the differences identified between the baseline surveys will be shared with key stakeholders and, will be assessed in full in the ES.

Figure 2.2: Green Hill Solar Farm



Section 3.0: Receptor Identification

3.1 Residential Dwellings

While no technical distance limits/thresholds are reported within which solar reflections are possible for such receptors, the potential for significance of a reflection decreases with distance due to an observer's decreasing field of vision capability with increasing distance, as well as possible obstructions such as shielding caused by terrain and vegetation. Industry guidance advises that dwelling receptors at up to 1 km from solar panels may be considered in terms of potential glare impact.

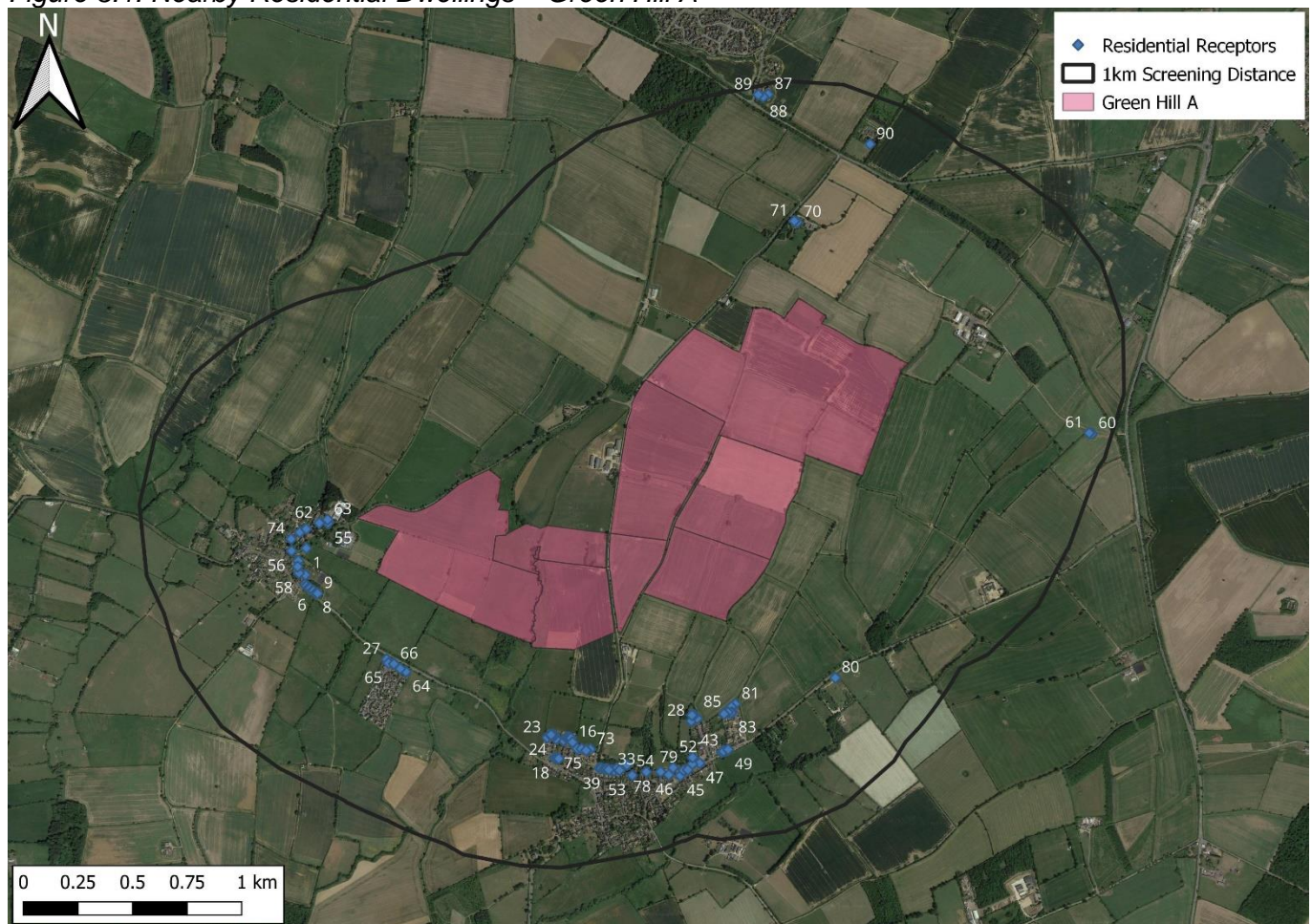
A number of residential dwellings exist within 1 km of the Scheme boundaries. Only the receptor points closest to the Scheme with a potential line of sight towards the PV panels were considered, as other dwellings are expected to be screened by these receptors, as well as vegetation and/or other infrastructure found in between them. The high-level review was undertaken using mapping and aerial photography.

The residential dwellings will be modelled at an additional height of 1.8m above ground level as this is considered to represent typical viewing height on ground floor, which is typically occupied during daylight hours.

3.1.1 Green Hill A

In total, 90 residential dwellings have been identified within this area. Receptor points closest to the Scheme with a potential line of sight towards the PV panels can be seen below in Figure 3.1.

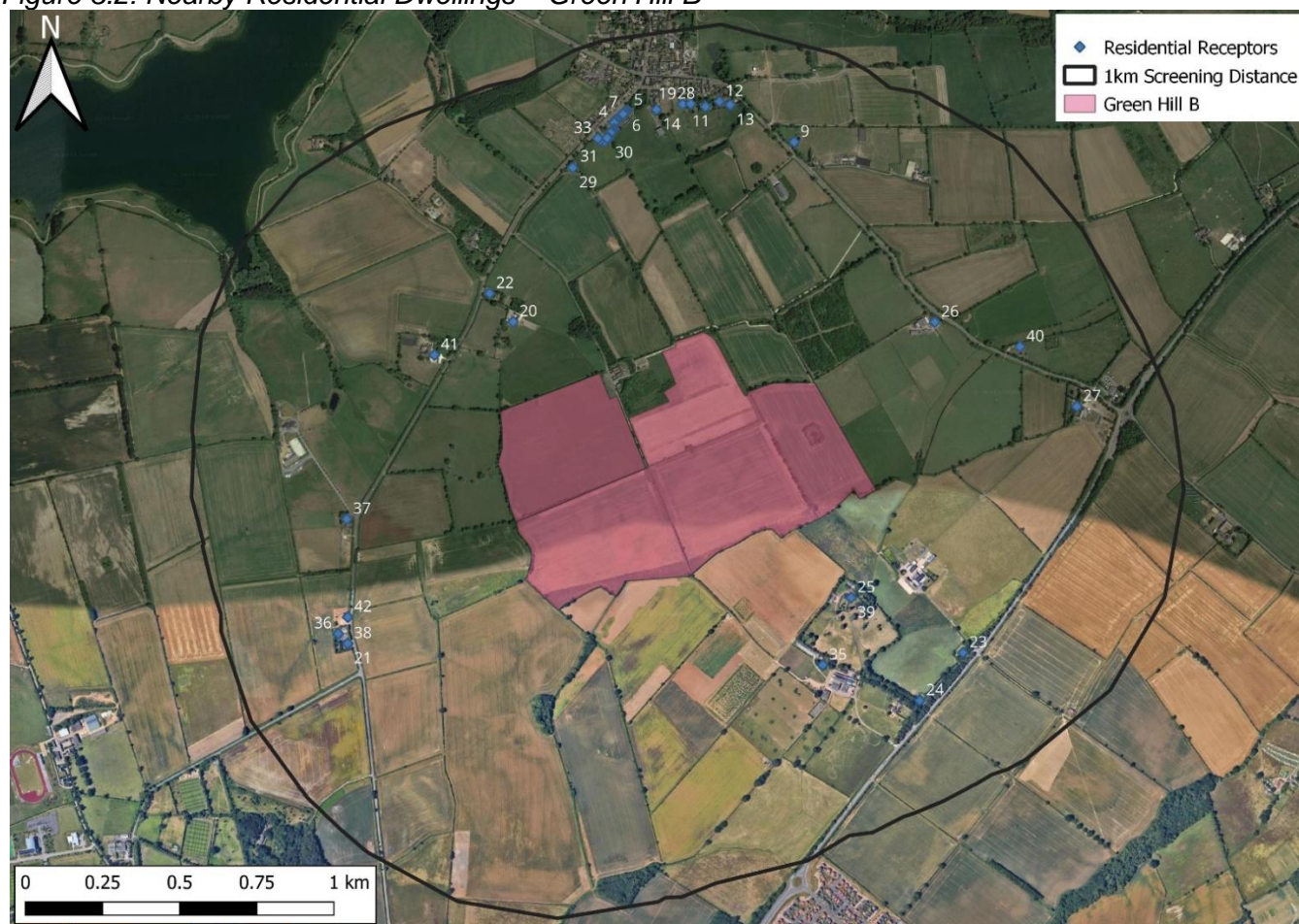
Figure 3.1: Nearby Residential Dwellings – Green Hill A



3.1.2 Green Hill B

In total, 42 residential dwellings have been identified assessment within this area. Receptor points closest to the Scheme with a potential line of sight towards the PV panels can be seen below in Figure 3.2.

Figure 3.2: Nearby Residential Dwellings – Green Hill B

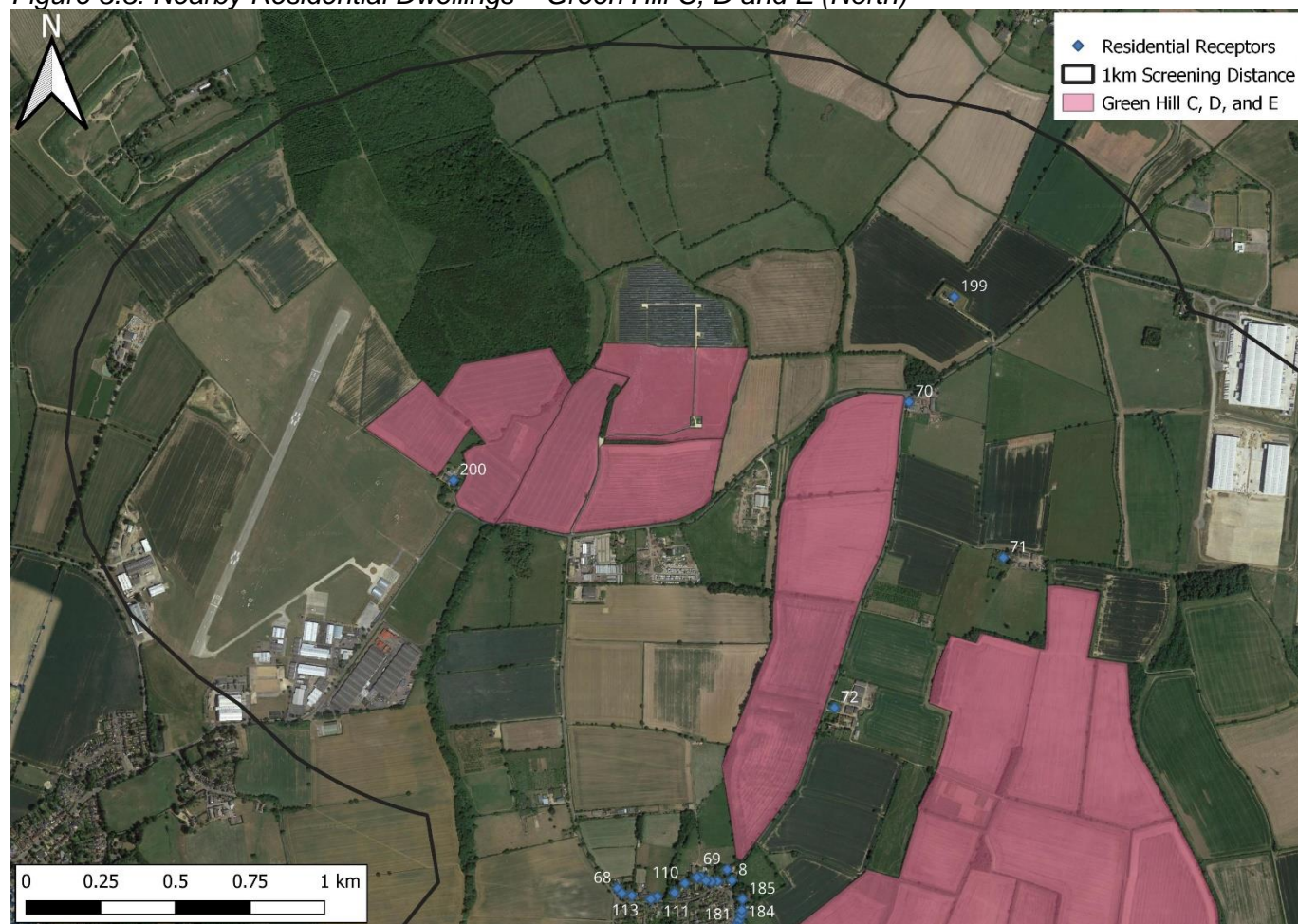


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3.1.3 Green Hill C, D and E

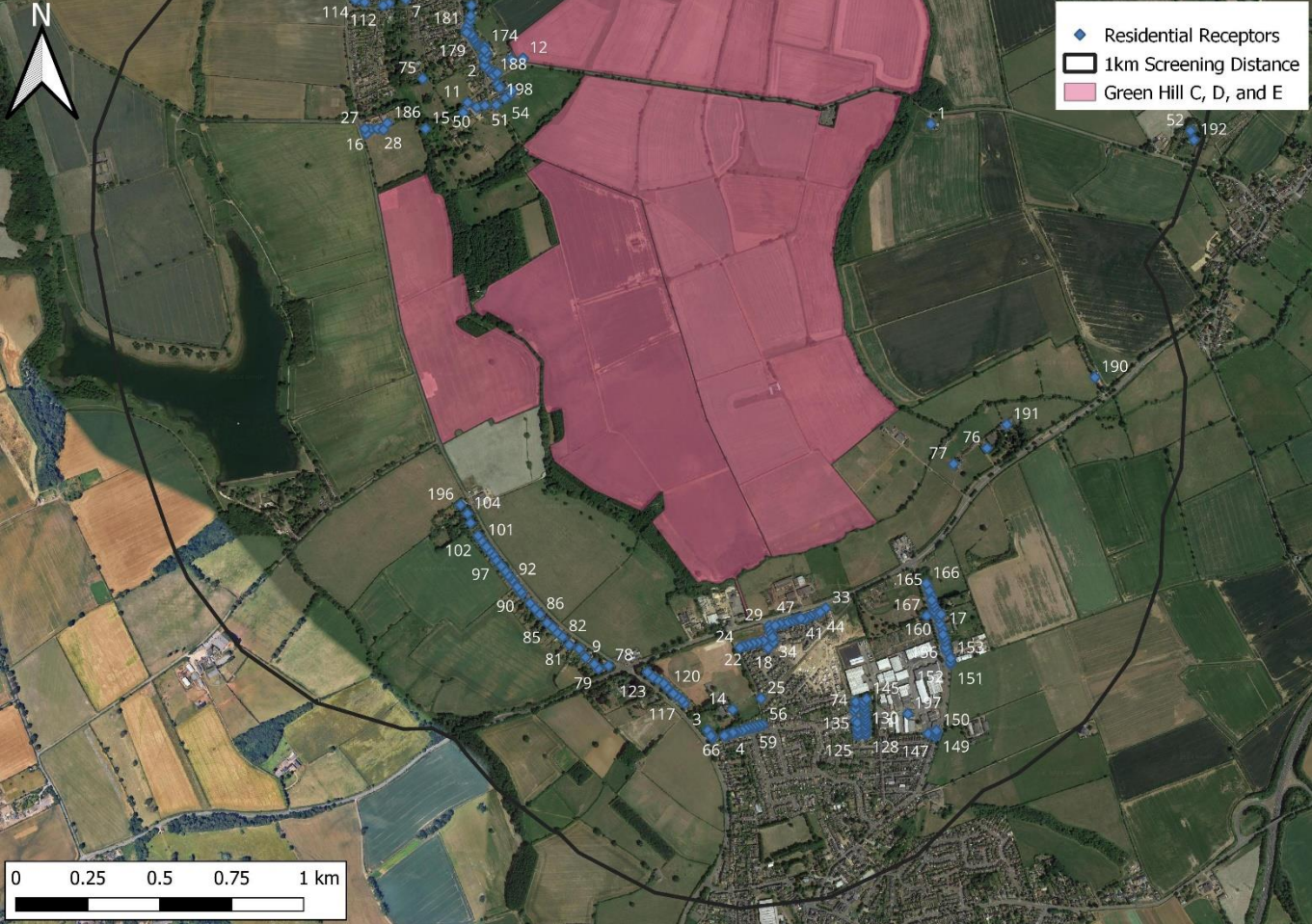
In total, 202 residential dwellings have been identified assessment within this area. Receptor points closest to the Scheme with a potential line of sight towards the PV panels can be seen below in Figure 3.3 and Figure 3.4.

Figure 3.3: Nearby Residential Dwellings – Green Hill C, D and E (North)



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Figure 3.4: Nearby Residential Dwellings – Green Hill C, D and E (South)

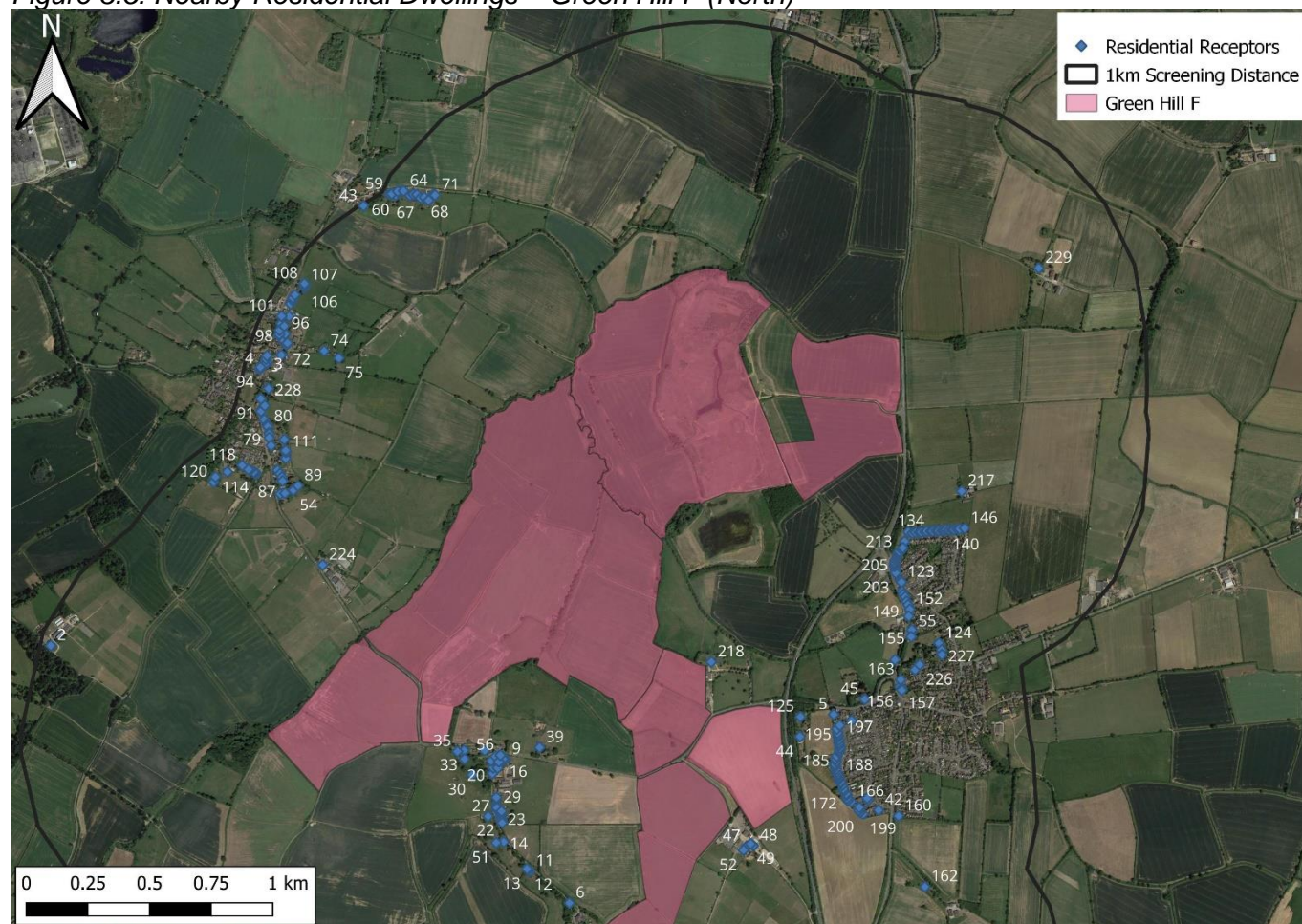


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3.1.4 Green Hill F

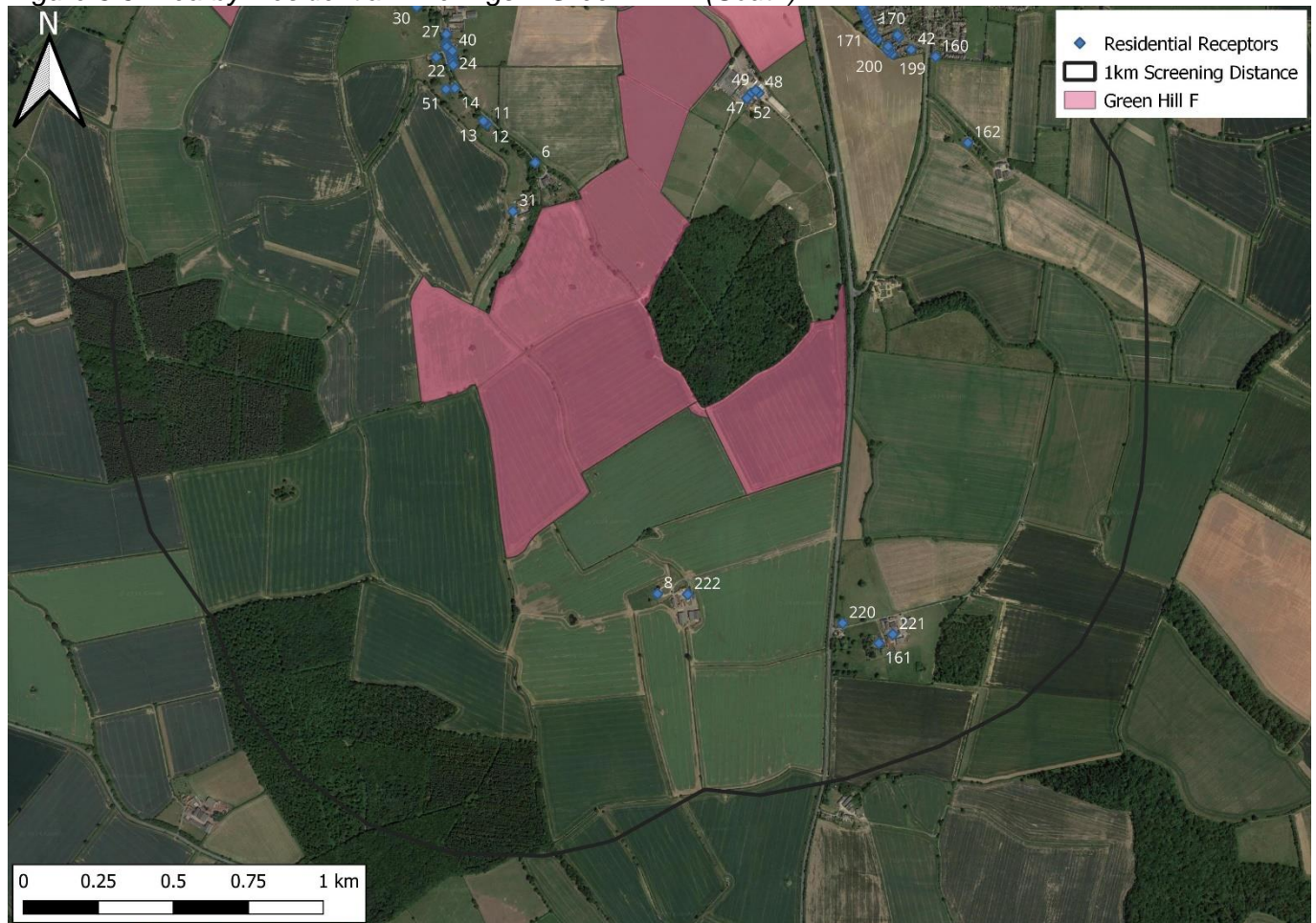
In total, 229 residential dwellings have been identified assessment within this area. Receptor points closest to the Scheme with a potential line of sight towards the PV panels can be seen below in Figure 3.5 and Figure 3.6.

Figure 3.5: Nearby Residential Dwellings – Green Hill F (North)



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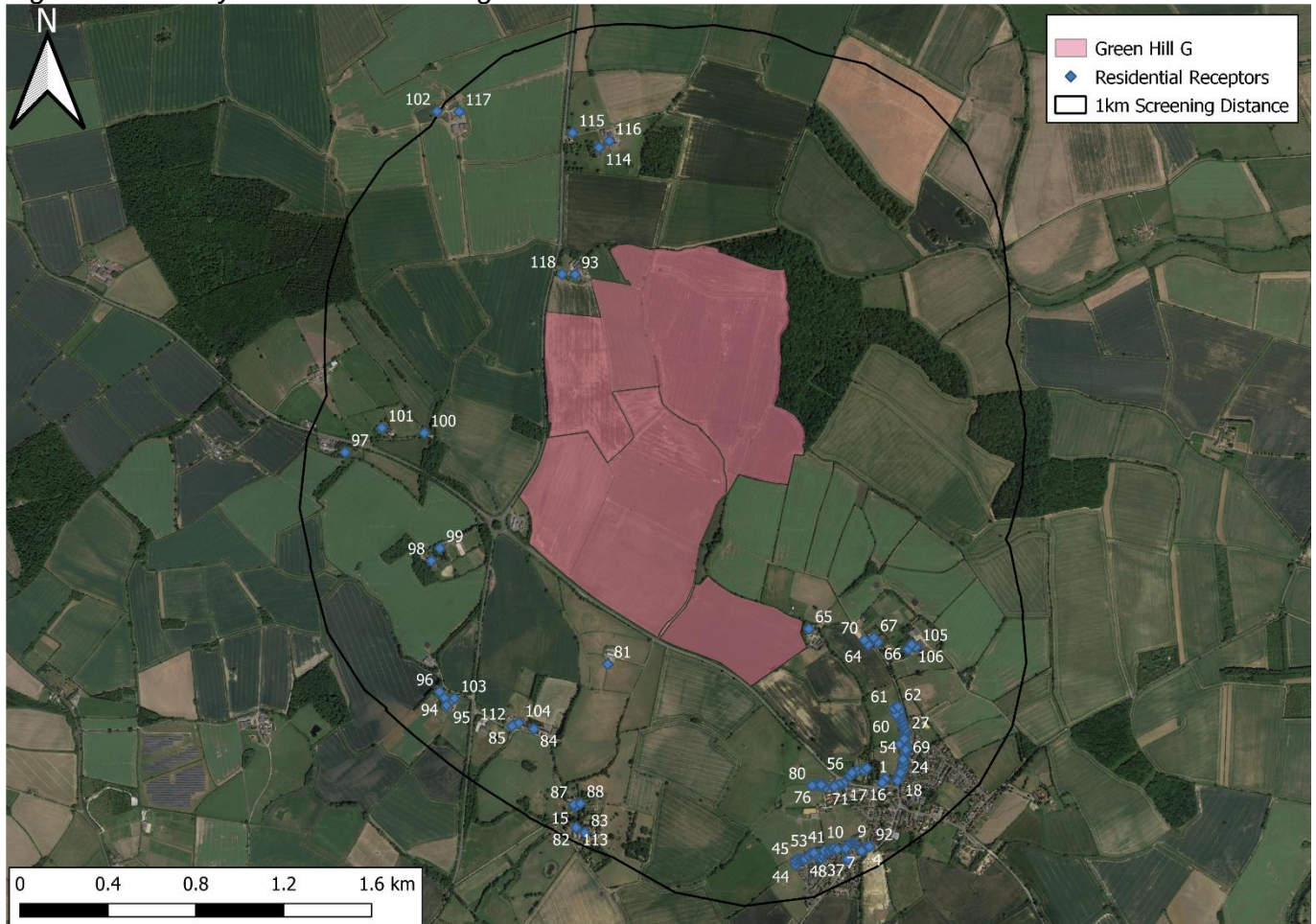
Figure 3.6: Nearby Residential Dwellings – Green Hill F (South)



3.1.5 Green Hill G

In total, 118 residential dwellings have been identified assessment within this area. Receptor points closest to the Scheme with a potential line of sight towards the PV panels can be seen below in Figure 3.7. It is noted that Green Hill F and Green Hill G share five residential receptors.

Figure 3.7 Nearby Residential Dwellings – Green Hill G



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3.1.6 Summary

The initial review list of dwelling receptors is presented in Appendix A.

Professional judgement will be applied in the selection of representative dwellings from this list for technical modelling where there are clusters of multiple dwellings with a similar view of the Scheme.

3.2 Road Infrastructure

In accordance with industry guidance, road receptors within 1km of the site boundary of the Scheme may be considered.

Major National, National and Regional roads are predicted to have higher level of traffic compared to local roads and have higher sensitivity. Therefore, these roads that are within 1 km from the solar PV development boundary with a visual line of sight to the panels will be considered for the technical modelling.

In accordance with industry guidance, technical modelling is not recommended for local roads, where traffic densities are likely to be relatively low. Any solar reflections from the Scheme that are experienced by a road user along a local road would be considered 'Low / Minor' impact magnitude.

The residential dwellings will be modelled at an additional height of 1.5m above ground level as this is considered to represent typical viewing height of road users.

3.2.1 Green Hill A

A high-level receptor screening indicates that no Major National, National and Regional roads are within the 1 km of the Scheme.

Therefore, road infrastructure would not be considered within the modelling assessment for this area.

3.2.2 Green Hill B

A high-level receptor screening indicates that Kettering Road (A43) lies within 1km of the Scheme. This section of the A43 road is not on the Strategic Road Network¹ and it is expected that it will be managed by the local authorities, North Northamptonshire Council and West Northamptonshire Council.

A high-level review indicates that there is no line of sight from the A43 and the proposed arrays. As such, the A43 would be qualitatively reviewed in the assessment, but would not have to be included within the technical modelling.

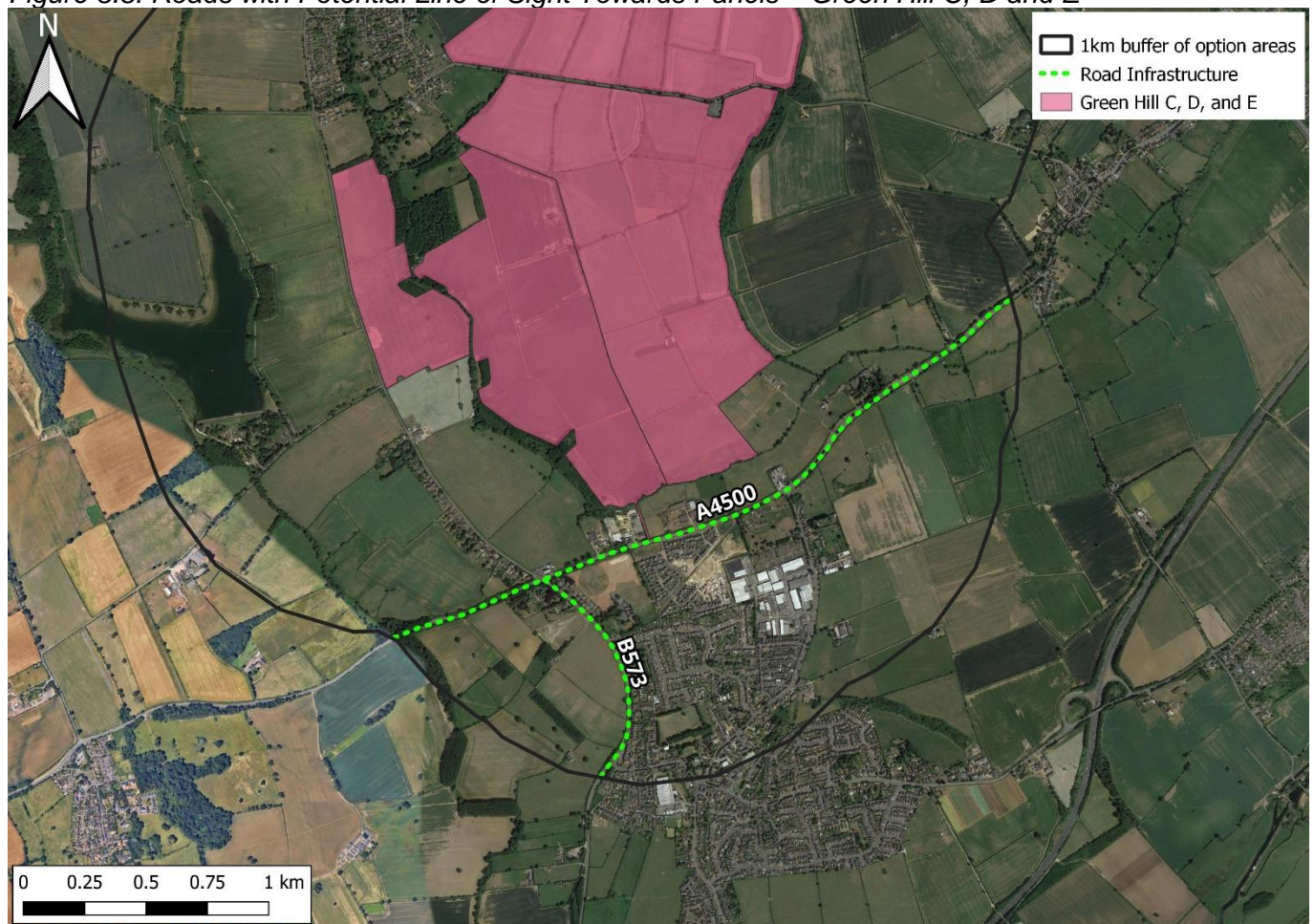
3.2.3 Green Hill C, D and E

A high-level receptor screening indicates that the A4500, A509 and Northampton Road (B573) lie within 1km of the Scheme. These roads are not on the Strategic Road Network¹⁴ and it is expected that they will be managed by the local authority, North Northamptonshire Council.

A high-level review indicates that there is no line of sight from the A509 and the proposed arrays. As such, the A509 would be qualitatively included in the assessment, but would not have to be included within the technical modelling.

Based on a high-level review, there is a potential line of sight to the panels from A4500 and B573 road users such that glare modelling should be undertaken, as shown below in Figure 3.8.

Figure 3.8: Roads with Potential Line of Sight Towards Panels – Green Hill C, D and E



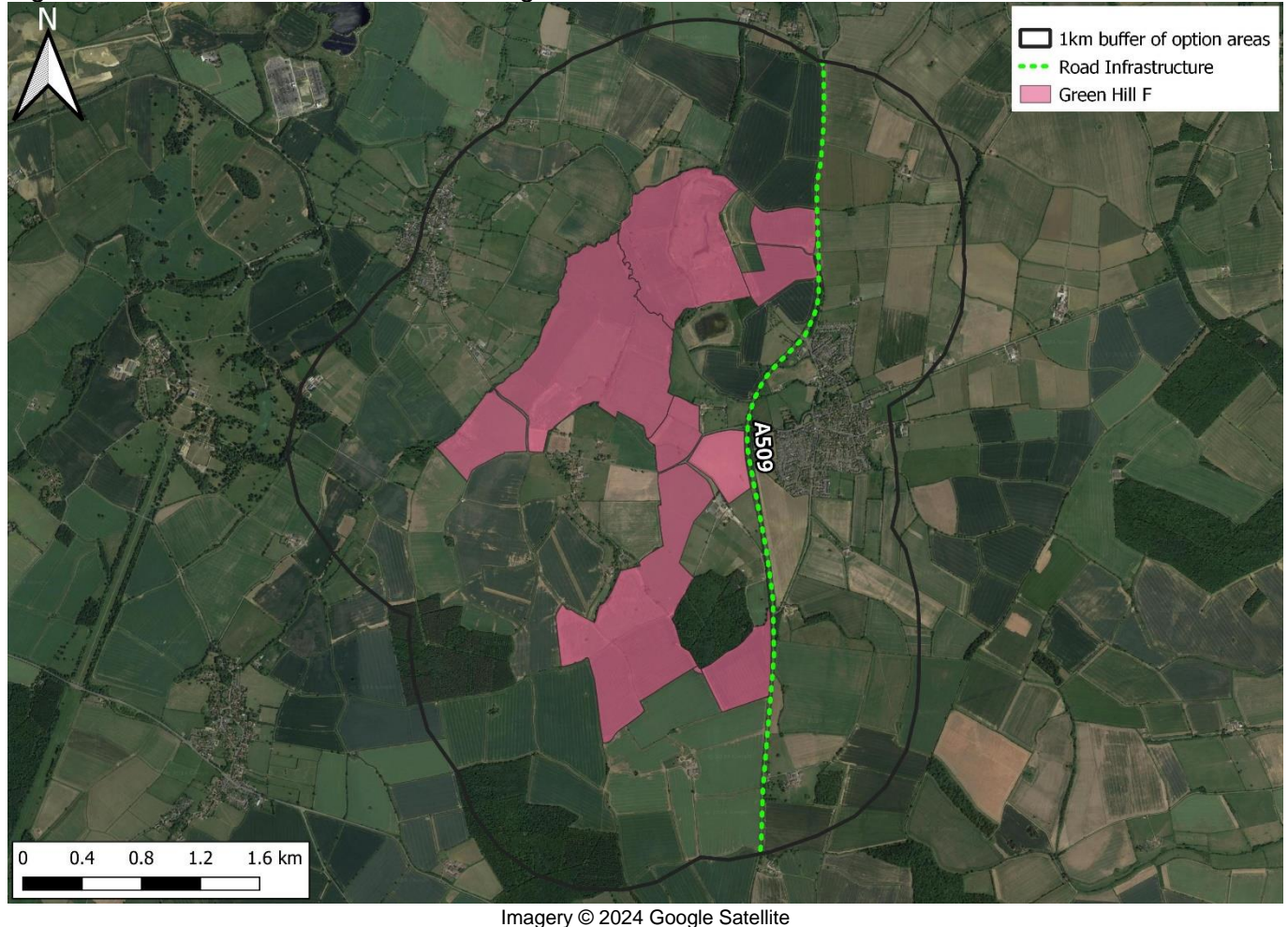
¹ National Highways, Strategic Road Network map

3.2.4 Green Hill F

A high-level receptor screening indicates that the A509 lies within 1km of the Scheme. This road is not on the Strategic Road Network¹⁴ and it is expected that it will be managed by the local authority, North Northamptonshire Council.

Based on a high-level review, there is a potential line of sight to the panels from the A509 road users such that glare modelling should be undertaken, as shown below in Figure 3.9.

Figure 3.9: Roads with Potential Line of Sight Towards Panels – Green Hill F

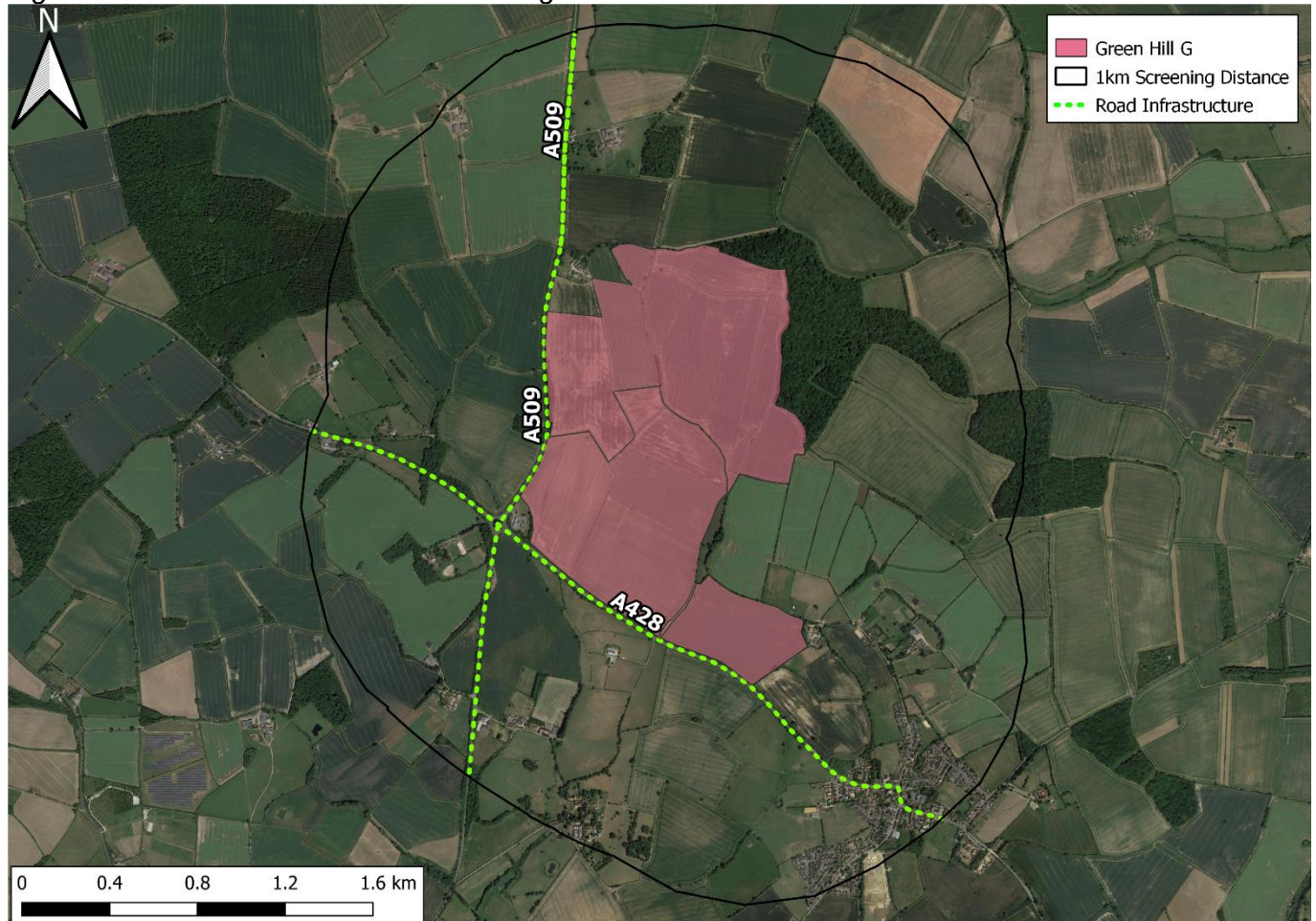


3.2.5 Green Hill G

A high-level receptor screening indicates that the A428 and the A509 lies within 1km of the Scheme. This section of the A428 nor the A509 are on the Strategic Road Network¹⁴ and it is expected that it will be managed by the local authorities, North Northamptonshire Council and City of Milton Keynes Council.

Based on a high-level review, there is a potential line of sight to the panels from the A509 road users such that glare modelling should be undertaken, as shown below in Figure 3.10. It is noted that road users along the A509 will be affected by both Green Hill F and Green Hill G.

Figure 3.10 Roads with Potential Line of Sight Towards Panels – Green Hill G



3.2.6 Summary

As above, the following sections of roads are within 1km of the Scheme with a potential line of sight and will be taken forward for technical modelling:

- The A4500 and B573 were identified within the screening distance of Green Hill E.
- The A509 was identified within the screening distance of Green Hill F and Green Hill G.
- The A428 was identified within the screening distance of Green Hill G.

Further details of the receptors to be modelled are presented in Appendix B.

Other sections of roads within 1km the Scheme without line of sight will be discussed qualitatively within the assessment but not included within the technical modelling. These include:

- Kettering Road (A43) was identified within the screening distance of Green Hill B.
- The A509 was identified within the screening distance of Green Hill E

3.3 Aviation Infrastructure

The CAA CAST guidance² specifies that:

“The receptors that should be considered are usually ATS personnel in a control tower and pilots of aircraft within a suitable distance of an aerodrome. It is essential to conduct a glint and glare assessment when a reflective surface is to be located on or immediately adjacent to an aerodrome. In most cases, an assessment should be undertaken for a solar PV development which is being proposed within a specific distance (indicated by the aerodrome authority) from an aerodrome. For many aerodromes, 5km is the distance of choice but it could be considered out to 10km. In exceptional circumstances, assessments may be required beyond 10km.”

The glint and glare assessment will evaluate the potential impacts of the Scheme on light-sensitive aviation infrastructure receptors. The assessment will assess the impact on the:

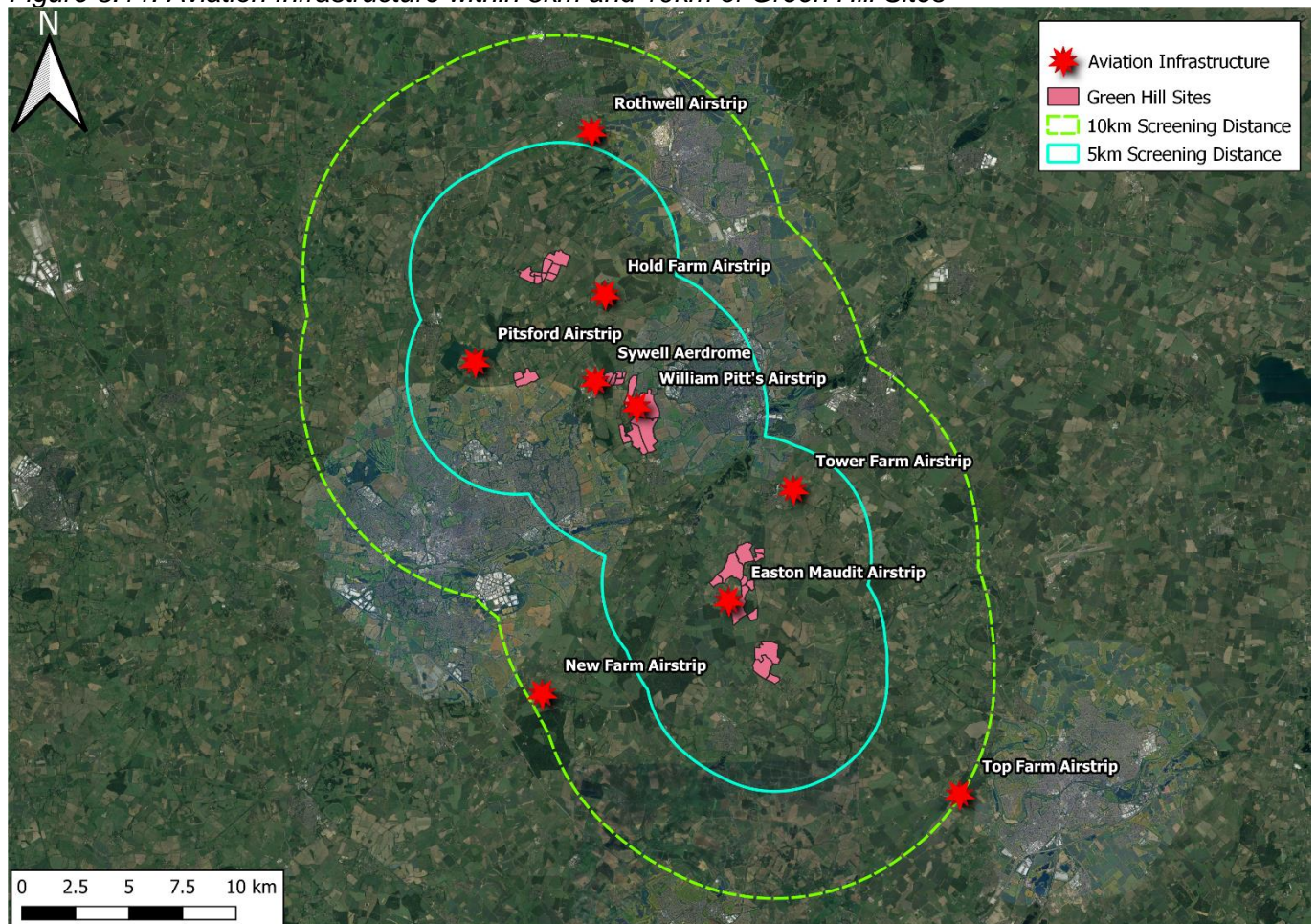
- Pilots in aircraft on final approach towards the aerodrome’s runway(s); and
- The Air Traffic Control Tower (ATCT, if applicable).

Further consultation with the aerodromes may be required to understand if additional assessments, such as pilots in a visual circuit, required.

Aerodromes immediately adjacent to solar panel areas and those within 5km will be modelled. Aerodromes at 5-10km from solar panel areas may be qualitatively assessed, although modelling may be considered at further distances where there are other panel areas within 5km of the aerodrome.

Aviation infrastructure within 5km and 10km are shown below in Figure 3.11.

Figure 3.11: Aviation Infrastructure within 5km and 10km of Green Hill Sites



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² Available at [\[redacted\]](#)
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The approach flight paths will be modelled using the in-built 2-mile flight approach path tool within ForgeSolar. In accordance with the U.S. FAA guidance, the final approach path was defined as two miles from fifty feet above the landing threshold using a standard three-degree glidepath. In addition, observation points (OPs) will be modelled along all flight paths as a worst-case assessment which do not include field of view of the pilots. The flight path height at each OP follows the below altitude profile:

Observation Point	Altitude Above Ground (m)
Threshold – point closest to ground/runway (0 miles)	15.2
¼ miles	36.3
½ miles	57.4
¾ miles	78.5
1 miles	99.5
1 ¼ miles	120.6
1 ½ miles	141.7
1 ¾ miles	162.8
2 miles	183.9

3.3.1 Green Hill A

A high-level receptor screening exercise with a focus area of 10km indicates the following aviation infrastructure:

- Hold Farm Airstrip – approximately 2.7km southeast of site.
- Pitsford Airstrip – approximately 4.4km southwest of site.
- Sywell Aerodrome – approximately 5.3km southeast of site.
- Rothwell Airstrip – approximately 5.8km north of site.
- William Pitt Airstrip – approximately 7.1km southeast of site.

3.3.2 Green Hill B

A high-level receptor screening exercise with a focus area of 10km indicates the following aviation infrastructure:

- Pitsford Airstrip – approximately 1.9km west of site.
- Sywell Aerodrome – approximately 3.8km east of site.
- William Pitt Airstrip – approximately 4.8km east of site.
- Hold Farm Airstrip – approximately 4.8km northeast of site.

3.3.3 Green Hill C, D, and E

A high-level receptor screening exercise with a focus area of 10km indicates the following aviation infrastructure:

- Sywell Aerodrome – immediately adjacent to Area C.
- William Pitt Airstrip – immediately adjacent to Areas D and E.
- Hold Farm Airstrip – approximately 3.6km north of site.
- Pitsford Airstrip – approximately 5.5km west of site.
- Tower Farm Airstrip – approximately 6.7km southeast of site.
- Easton Maudit Airstrip – approximately 7.7km south of site.

3.3.4 Green Hill F

A high-level receptor screening exercise with a focus area of 10km indicates the following aviation infrastructure:

- Easton Maudit Airstrip – immediately adjacent to Area F
- Tower Farm Airstrip – approximately 3.2km northeast of site.
- William Pitt Airstrip – approximately 8.0km northeast of site.
- New Farm Airfield – approximately 10.0km south of site.
- Sywell Aerodrome – approximately 10.0km northeast of site.

3.3.5 Green Hill G

A high-level receptor screening exercise with a focus area of 10km indicates the following aviation infrastructure:

- Easton Maudit Airstrip – approximately 2.4km northwest of site.
- Top Farm Airstrip – approximately 9.9km southeast of site.
- Tower Farm Airstrip – approximately 9.9km southwest of site.

3.3.6 Summary

As above, the following aerodromes are within 5km of the Scheme and will be taken forward for technical modelling:

- Hold Farm Airstrip
- Pitsford Airstrip
- Sywell Aerodrome
- William Pitt Airstrip
- Easton Maudit Airstrip
- Tower Farm Airstrip

Further details of the receptors to be modelled are presented in Appendix C.

Other aviation receptors between 5km and 10km from the Scheme include Rothwell Airstrip, New Farm Airfield, and Top Farm Airstrip. None of these aerodromes have an ATCT. It is likely that at this distance, any glare towards pilots on final approach will have 'low potential for after-image' (green glare), which corresponds to a 'Low / Minor' magnitude impact. Coupled with the 'Medium' receptor sensitivity, it is not considered possible to have significant glint and glare impacts upon these aerodromes. Technical modelling is not proposed for these aerodromes on this basis.

3.4 Rail Infrastructure

In accordance with industry guidance, rail operators may raise an objection to solar developments that are within 500m of their infrastructure due to safety implications caused by glare on train drivers, level crossings and railway light signals.

3.4.1 Green Hill A

A high-level receptor review indicates no rail infrastructure within this screening distance. Therefore, no railway receptors would be considered within the modelling assessment for this area.

3.4.2 Green Hill B

A high-level receptor review indicates no rail infrastructure within this screening distance. Therefore, no railway receptors would be considered within the modelling assessment for this area.

3.4.3 Green Hill C, D, and E

A high-level receptor review indicates no rail infrastructure within this screening distance. Therefore, no railway receptors would be considered within the modelling assessment for this area.

3.4.4 Green Hill F

A high-level receptor review indicates no rail infrastructure within this screening distance. Therefore, no railway receptors would be considered within the modelling assessment for this area.

3.4.5 Green Hill G

A high-level receptor review indicates no rail infrastructure within this screening distance. Therefore, no railway receptors would be considered within the modelling assessment for this area.

3.4.6 Summary

As above, no rail infrastructure was identified within the screening distance of any Green Hill sites. Technical modelling of railway infrastructure is scoped out on this basis.

Section 4.0: Stakeholder Consultation

4.1 Consultation Process

The following stakeholders will require consultation:

- Safeguarding personnel at
 - Hold Farm Airstrip
 - Pitsford Airstrip
 - Sywell Aerodrome
 - William Pitt Airstrip
 - Easton Maudit Airstrip
 - Tower Farm Airstrip

Appendix A: Dwelling Receptor Details

Green Hill A

Receptor	Latitude (°)	Longitude (°)	Receptor	Latitude (°)	Longitude (°)
1	52.35227	-0.84659	46	52.34222	-0.82181
2	52.35029	-0.84607	47	52.34268	-0.81973
3	52.35023	-0.84597	48	52.34265	-0.82021
4	52.35015	-0.84580	49	52.34322	-0.81779
5	52.35013	-0.84572	50	52.34265	-0.82462
6	52.35004	-0.84555	51	52.34240	-0.82081
7	52.35002	-0.84549	52	52.34292	-0.82019
8	52.34994	-0.84532	53	52.34222	-0.82427
9	52.34991	-0.84523	54	52.34235	-0.82236
10	52.35244	-0.84635	55	52.35279	-0.84445
11	52.34370	-0.82886	56	52.35168	-0.84693
12	52.34383	-0.82867	57	52.35069	-0.84603
13	52.34383	-0.82857	58	52.35076	-0.84646
14	52.34382	-0.82846	59	52.34241	-0.82053
15	52.34380	-0.82835	60	52.35597	-0.79298
16	52.34362	-0.82825	61	52.35600	-0.79316
17	52.34299	-0.82948	62	52.35281	-0.84504
18	52.34297	-0.82940	63	52.35294	-0.84447
19	52.34296	-0.82928	64	52.34664	-0.83937
20	52.34296	-0.82919	65	52.34700	-0.84053
21	52.34377	-0.82936	66	52.34696	-0.84017
22	52.34392	-0.82946	67	52.34677	-0.83975
23	52.34383	-0.82994	68	52.35128	-0.84649
24	52.34394	-0.82956	69	52.35103	-0.84654
25	52.34395	-0.82975	70	52.36487	-0.81256
26	52.34394	-0.82968	71	52.36492	-0.81276
27	52.34716	-0.84065	72	52.35286	-0.84596
28	52.34442	-0.82024	73	52.34332	-0.82705
29	52.34452	-0.81984	74	52.35217	-0.84694
30	52.34467	-0.82004	75	52.34336	-0.82793
31	52.34466	-0.82019	76	52.34335	-0.82765
32	52.34255	-0.82647	77	52.34328	-0.82735
33	52.34246	-0.82566	78	52.34235	-0.82332
34	52.34242	-0.82547	79	52.34251	-0.82151
35	52.34252	-0.82530	80	52.34610	-0.81051
36	52.34244	-0.82511	81	52.34509	-0.81726
37	52.34253	-0.82634	82	52.34497	-0.81753
38	52.34251	-0.82613	83	52.34474	-0.81748
39	52.34251	-0.82599	84	52.34474	-0.81756
40	52.34247	-0.82584	85	52.34475	-0.81778
41	52.34311	-0.81822	86	52.34469	-0.81803
42	52.34320	-0.81787	87	52.37014	-0.81439
43	52.34316	-0.81803	88	52.37005	-0.81471
44	52.34315	-0.81810	89	52.37014	-0.81505
45	52.34218	-0.82103	90	52.36802	-0.80758

Green Hill B

Receptor	Latitude (°)	Longitude (°)	Receptor	Latitude (°)	Longitude (°)
1	52.31863	-0.83998	22	52.31359	-0.84622
2	52.31859	-0.84006	23	52.30289	-0.82398
3	52.31855	-0.84013	24	52.30152	-0.82607
4	52.31851	-0.84016	25	52.30455	-0.82926
5	52.31887	-0.83952	26	52.31255	-0.82507
6	52.31885	-0.83961	27	52.31002	-0.81838
7	52.31881	-0.83967	28	52.31903	-0.83651
8	52.31876	-0.83973	29	52.31722	-0.84216
9	52.31787	-0.83162	30	52.31808	-0.84044
10	52.31722	-0.84216	31	52.31797	-0.84065
11	52.31895	-0.83581	32	52.31801	-0.84085
12	52.31909	-0.83515	33	52.31806	-0.84095
13	52.31898	-0.83463	34	52.31807	-0.84051
14	52.31888	-0.83814	35	52.3026	-0.83066
15	52.31833	-0.84016	36	52.30374	-0.85368
16	52.31829	-0.84022	37	52.30708	-0.85318
17	52.31826	-0.84028	38	52.30345	-0.85323
18	52.31822	-0.84034	39	52.30455	-0.82926
19	52.31902	-0.8369	40	52.31179	-0.82104
20	52.31276	-0.84512	41	52.31182	-0.84889
21	52.30345	-0.85323	42	52.30422	-0.85321

Green Hill C, D, and E

Receptor	Latitude (°)	Longitude (°)	Receptor	Latitude (°)	Longitude (°)
1	52.28944	-0.74606	102	52.27682	-0.76948
2	52.2918	-0.76883	103	52.27722	-0.76986
3	52.27061	-0.75796	104	52.27751	-0.77
4	52.27047	-0.75687	105	52.29395	-0.77058
5	52.29169	-0.76738	106	52.29394	-0.77089
6	52.29071	-0.76737	107	52.29408	-0.7714
7	52.29363	-0.7727	108	52.29408	-0.77159
8	52.29397	-0.76987	109	52.29397	-0.77115
9	52.27296	-0.76411	110	52.2939	-0.77218
10	52.27323	-0.76443	111	52.29351	-0.77356
11	52.29037	-0.76964	112	52.29344	-0.77387
12	52.29172	-0.76677	113	52.29356	-0.7748
13	52.27472	-0.74646	114	52.29364	-0.77528
14	52.27125	-0.75669	115	52.27038	-0.75774
15	52.28957	-0.77181	116	52.27148	-0.75913
16	52.28956	-0.77464	117	52.27159	-0.75926
17	52.27365	-0.74592	118	52.27171	-0.7595
18	52.27351	-0.75485	119	52.27178	-0.75968
19	52.27338	-0.75503	120	52.27198	-0.75999
20	52.27334	-0.75533	121	52.27211	-0.76016
21	52.2733	-0.75558	122	52.27223	-0.76047
22	52.27326	-0.75582	123	52.27231	-0.76073
23	52.27322	-0.75607	124	52.27247	-0.76098

Receptor	Latitude (°)	Longitude (°)	Receptor	Latitude (°)	Longitude (°)
24	52.27319	-0.75625	125	52.27036	-0.7503
25	52.27158	-0.75522	126	52.27038	-0.74992
26	52.28945	-0.77483	127	52.27042	-0.7503
27	52.2896	-0.7749	128	52.27047	-0.74992
28	52.2896	-0.77424	129	52.27054	-0.75032
29	52.27385	-0.75474	130	52.27057	-0.74993
30	52.27371	-0.75469	131	52.27062	-0.75033
31	52.27359	-0.75463	132	52.27066	-0.74992
32	52.27333	-0.75452	133	52.27077	-0.75034
33	52.27437	-0.75185	134	52.27076	-0.74989
34	52.27349	-0.75458	135	52.27121	-0.7504
35	52.27391	-0.75399	136	52.27084	-0.74993
36	52.2739	-0.75419	137	52.27138	-0.75039
37	52.27385	-0.75443	138	52.27094	-0.74994
38	52.27396	-0.75376	139	52.27143	-0.7504
39	52.274	-0.75352	140	52.27104	-0.74994
40	52.27403	-0.75335	141	52.27114	-0.74996
41	52.27406	-0.7532	142	52.27124	-0.74995
42	52.27417	-0.75236	143	52.27133	-0.74999
43	52.27413	-0.75262	144	52.27143	-0.74997
44	52.27425	-0.75213	145	52.27151	-0.74985
45	52.27407	-0.75276	146	52.27296	-0.74573
46	52.27404	-0.75292	147	52.27029	-0.74639
47	52.27407	-0.75312	148	52.27036	-0.74633
48	52.28956	-0.77395	149	52.27044	-0.74633
49	52.27039	-0.74673	150	52.27048	-0.74632
50	52.29022	-0.76918	151	52.27256	-0.74553
51	52.29026	-0.76876	152	52.27261	-0.74555
52	52.28909	-0.73285	153	52.27274	-0.74553
53	52.29054	-0.76753	154	52.27308	-0.74577
54	52.29048	-0.76773	155	52.27326	-0.7458
55	52.29028	-0.76818	156	52.27338	-0.74584
56	52.27076	-0.75514	157	52.27348	-0.7459
57	52.27073	-0.75532	158	52.27382	-0.74605
58	52.2707	-0.75552	159	52.27399	-0.7461
59	52.27067	-0.75567	160	52.2741	-0.74615
60	52.27065	-0.75585	161	52.27421	-0.7463
61	52.27063	-0.75601	162	52.27435	-0.74632
62	52.27058	-0.75619	163	52.27444	-0.74639
63	52.27055	-0.75644	164	52.27456	-0.74644
64	52.27053	-0.75661	165	52.27487	-0.74658
65	52.27052	-0.75669	166	52.27508	-0.7467
66	52.27044	-0.757	167	52.27408	-0.74671
67	52.27044	-0.75711	168	52.29131	-0.76844
68	52.29379	-0.77549	169	52.2914	-0.76849
69	52.2943	-0.7701	170	52.29144	-0.76863
70	52.30825	-0.76078	171	52.29153	-0.76876
71	52.30353	-0.75628	172	52.29173	-0.76871

Receptor	Latitude (°)	Longitude (°)	Receptor	Latitude (°)	Longitude (°)
72	52.2991	-0.76469	173	52.29191	-0.76863
73	52.27085	-0.75044	174	52.29211	-0.76872
74	52.27114	-0.75049	175	52.29219	-0.76915
75	52.29113	-0.77191	176	52.29224	-0.7692
76	52.27928	-0.74349	177	52.29231	-0.76925
77	52.2788	-0.74521	178	52.29235	-0.76929
78	52.27269	-0.76295	179	52.29244	-0.76936
79	52.2726	-0.76348	180	52.2925	-0.7694
80	52.27274	-0.76368	181	52.29266	-0.76964
81	52.27336	-0.76493	182	52.29276	-0.76955
82	52.27362	-0.76528	183	52.29293	-0.76944
83	52.27376	-0.76555	184	52.29307	-0.76941
84	52.2739	-0.76576	185	52.2934	-0.76936
85	52.27406	-0.76605	186	52.28977	-0.77375
86	52.27433	-0.7664	187	52.29005	-0.76987
87	52.27451	-0.76666	188	52.29121	-0.76829
88	52.27468	-0.7669	189	52.29127	-0.7681
89	52.27497	-0.7673	190	52.28144	-0.73793
90	52.27505	-0.76736	191	52.28001	-0.74246
91	52.2752	-0.76753	192	52.2888	-0.73268
92	52.27542	-0.76779	193	52.27044	-0.7578
93	52.27553	-0.76792	194	52.29255	-0.76963
94	52.27557	-0.768	195	52.29092	-0.76809
95	52.27571	-0.76813	196	52.27779	-0.77035
96	52.27586	-0.76833	197	52.27103	-0.74775
97	52.27606	-0.7686	198	52.29081	-0.76799
98	52.27623	-0.76875	199	52.31139	-0.75847
99	52.27634	-0.76892	200	52.30613	-0.78321
100	52.27646	-0.76906	201	52.27412	-0.74598
101	52.27666	-0.76932	202	52.292	-0.76874

Green Hill F

Receptor	Latitude (°)	Longitude (°)	Receptor	Latitude (°)	Longitude (°)
1	52.23488	-0.7132	116	52.2307	-0.71518
2	52.22444	-0.72719	117	52.23073	-0.71528
3	52.23462	-0.71403	118	52.23089	-0.71564
4	52.23438	-0.71449	119	52.23065	-0.71653
5	52.22142	-0.68078	120	52.23029	-0.71735
6	52.21472	-0.69667	121	52.23048	-0.71724
7	52.23629	-0.71271	122	52.22625	-0.67667
8*	52.20174	-0.69108	123	52.22619	-0.67661
9	52.22	-0.70031	124	52.22395	-0.67446
10	52.21817	-0.70087	125	52.22136	-0.68275
11	52.21591	-0.69899	126	52.22802	-0.67615
12	52.21596	-0.69908	127	52.22768	-0.67638
13	52.21599	-0.69916	128	52.22798	-0.6759
14	52.21699	-0.70051	129	52.228	-0.67572
15	52.21794	-0.7014	130	52.228	-0.67551

Receptor	Latitude (°)	Longitude (°)	Receptor	Latitude (°)	Longitude (°)
16	52.22009	-0.70045	131	52.22801	-0.67539
17	52.21949	-0.7011	132	52.22801	-0.67517
18	52.2197	-0.70105	133	52.22804	-0.67505
19	52.21995	-0.70097	134	52.22803	-0.67482
20	52.21996	-0.70116	135	52.22803	-0.6747
21	52.22001	-0.70045	136	52.22804	-0.67448
22	52.21795	-0.70065	137	52.22804	-0.67434
23	52.21787	-0.70062	138	52.22805	-0.67414
24	52.21778	-0.70061	139	52.22805	-0.67404
25	52.21768	-0.70058	140	52.22808	-0.67391
26	52.21981	-0.70074	141	52.22806	-0.67372
27	52.21837	-0.70092	142	52.22806	-0.67355
28	52.21831	-0.7009	143	52.22807	-0.67343
29	52.21824	-0.70087	144	52.22809	-0.67323
30	52.21946	-0.70232	145	52.2281	-0.6731
31	52.21327	-0.6978	146	52.22812	-0.67281
32	52.22011	-0.7009	147	52.22586	-0.67658
33	52.22035	-0.70277	148	52.22575	-0.67651
34	52.22004	-0.70275	149	52.22566	-0.67641
35	52.22032	-0.70316	150	52.22549	-0.67633
36	52.21969	-0.70079	151	52.22536	-0.67624
37	52.21861	-0.70089	152	52.2252	-0.67615
38	52.22033	-0.70154	153	52.22495	-0.67623
39	52.22041	-0.69828	154	52.22445	-0.67605
40	52.21811	-0.70061	155	52.2242	-0.6761
41	52.23548	-0.71315	156	52.22238	-0.67683
42	52.2179	-0.67822	157	52.22233	-0.6767
43	52.24026	-0.70816	158	52.22226	-0.6767
44	52.22063	-0.68281	159	52.22337	-0.67709
45	52.22195	-0.67892	160	52.21768	-0.67704
46	52.22665	-0.67696	161*	52.20014	-0.68033
47	52.21668	-0.68609	162	52.21508	-0.67555
48	52.21669	-0.6857	163	52.22264	-0.67676
49	52.21676	-0.68585	164	52.21827	-0.67883
50	52.23688	-0.71247	165	52.21835	-0.67888
51	52.21697	-0.70096	166	52.21823	-0.67984
52	52.21653	-0.68628	167	52.21827	-0.68004
53	52.21992	-0.70071	168	52.21836	-0.68008
54	52.22995	-0.71262	169	52.21847	-0.68011
55	52.22438	-0.67603	170	52.21853	-0.68012
56	52.22015	-0.70062	171	52.21862	-0.68026
57	52.22982	-0.7134	172	52.2187	-0.68029
58	52.24077	-0.70601	173	52.21884	-0.68035
59	52.24067	-0.70661	174	52.21892	-0.68043
60	52.24063	-0.70624	175	52.21896	-0.68045
61	52.24069	-0.70647	176	52.21906	-0.68053
62	52.24077	-0.70611	177	52.21913	-0.68056
63	52.24061	-0.70538	178	52.21921	-0.68059

Receptor	Latitude (°)	Longitude (°)	Receptor	Latitude (°)	Longitude (°)
64	52.24078	-0.70576	179	52.21925	-0.68061
65	52.24065	-0.70518	180	52.21933	-0.68067
66	52.24064	-0.70498	181	52.21942	-0.6807
67	52.24051	-0.70476	182	52.21952	-0.68074
68	52.24054	-0.70453	183	52.2196	-0.68076
69	52.24042	-0.70429	184	52.2197	-0.68067
70	52.24064	-0.704	185	52.21979	-0.68071
71	52.24061	-0.7039	186	52.2199	-0.68065
72	52.23525	-0.71288	187	52.22003	-0.68049
73	52.23531	-0.71283	188	52.22011	-0.68046
74	52.235	-0.71065	189	52.2202	-0.68044
75	52.23473	-0.70978	190	52.22029	-0.68048
76	52.23285	-0.71447	191	52.22038	-0.6805
77	52.23305	-0.71423	192	52.22048	-0.68051
78	52.23254	-0.71428	193	52.22059	-0.68054
79	52.23234	-0.71411	194	52.22066	-0.68055
80	52.23228	-0.71408	195	52.22075	-0.68057
81	52.23206	-0.71401	196	52.22089	-0.68061
82	52.23201	-0.714	197	52.22102	-0.68043
83	52.23187	-0.714	198	52.22118	-0.67972
84	52.23159	-0.7139	199	52.21778	-0.67914
85	52.23068	-0.71354	200	52.21784	-0.67932
86	52.23055	-0.71339	201	52.2179	-0.67938
87	52.23043	-0.71329	202	52.21801	-0.67936
88	52.23029	-0.71326	203	52.22654	-0.67695
89	52.2301	-0.71234	204	52.22679	-0.67701
90	52.22984	-0.71313	205	52.22687	-0.67701
91	52.2333	-0.71446	206	52.22691	-0.67699
92	52.23457	-0.71418	207	52.22701	-0.67696
93	52.23475	-0.71411	208	52.22707	-0.67689
94	52.23445	-0.71446	209	52.22714	-0.67684
95	52.23487	-0.71405	210	52.22717	-0.67683
96	52.23565	-0.71294	211	52.22722	-0.6768
97	52.2356	-0.71333	212	52.22725	-0.67676
98	52.23564	-0.7133	213	52.22729	-0.67675
99	52.23579	-0.71328	214	52.22732	-0.67671
100	52.23603	-0.71317	215	52.22737	-0.67654
101	52.2363	-0.71314	216	52.22745	-0.67649
102	52.23674	-0.71261	217	52.22947	-0.67294
103	52.23688	-0.71247	218	52.22341	-0.68799
104	52.23696	-0.71245	219	52.22299	-0.6759
105	52.23707	-0.71232	220*	52.20076	-0.68208
106	52.23734	-0.71175	221*	52.20039	-0.67964
107	52.23741	-0.71173	222*	52.2017	-0.68961
108	52.23747	-0.71175	223	52.23594	-0.71299
109	52.2318	-0.71311	224	52.2272	-0.71096
110	52.23111	-0.71305	225	52.2237	-0.67431
111	52.23134	-0.71302	226	52.22318	-0.67563

Receptor	Latitude (°)	Longitude (°)	Receptor	Latitude (°)	Longitude (°)
112	52.2314	-0.71304	227	52.22353	-0.67429
113	52.23058	-0.71481	228	52.23367	-0.714
114	52.23061	-0.71489	229	52.23755	-0.66812
115	52.23064	-0.71497	-	-	-
*Receptors shared with Green Hill G					

Green Hill G

Receptor	Latitude (°)	Longitude (°)	Receptor	Latitude (°)	Longitude (°)
1	52.1741	-0.66206	60	52.17671	-0.66128
2	52.17445	-0.66391	61	52.17696	-0.66139
3	52.17443	-0.66097	62	52.17703	-0.66112
4	52.17127	-0.6634	63	52.17938	-0.66038
5	52.17124	-0.66349	64	52.1796	-0.66304
6	52.1712	-0.66362	65	52.18029	-0.66696
7	52.17117	-0.66373	66	52.1797	-0.66239
8	52.17147	-0.6642	67	52.17988	-0.66265
9	52.17148	-0.6644	68	52.17402	-0.66125
10	52.17144	-0.66449	69	52.17537	-0.66061
11	52.17141	-0.6646	70	52.17979	-0.66329
12	52.17138	-0.6647	71	52.1738	-0.66604
13	52.17128	-0.66477	72	52.1739	-0.66625
14	52.17083	-0.66467	73	52.1739	-0.66633
15	52.17321	-0.68275	74	52.17389	-0.66642
16	52.17394	-0.66229	75	52.17389	-0.66651
17	52.17395	-0.66484	76	52.17389	-0.66659
18	52.1741	-0.66117	77	52.17388	-0.66668
19	52.17457	-0.66085	78	52.17388	-0.66677
20	52.17419	-0.66115	79	52.17388	-0.66686
21	52.17427	-0.66106	80	52.17388	-0.66694
22	52.17433	-0.66104	81	52.179	-0.68038
23	52.17476	-0.66082	82	52.17233	-0.68269
24	52.17504	-0.66072	83	52.17212	-0.68211
25	52.17515	-0.66068	84	52.17639	-0.68538
26	52.17551	-0.66105	85	52.17653	-0.68683
27	52.17587	-0.66066	86	52.17321	-0.68263
28	52.17593	-0.66068	87	52.17329	-0.6828
29	52.17604	-0.66067	88	52.17331	-0.68236
30	52.17609	-0.66069	89	52.17571	-0.66075
31	52.1762	-0.6608	90	52.17527	-0.66066
32	52.17625	-0.66082	91	52.17437	-0.66427
33	52.17637	-0.66087	92	52.17134	-0.66319
34	52.17641	-0.66089	93	52.19496	-0.68208
35	52.17653	-0.66095	94	52.17773	-0.69129
36	52.17657	-0.66097	95	52.17743	-0.69115
37	52.17089	-0.66644	96	52.17799	-0.6916
38	52.17104	-0.66638	97	52.18786	-0.6976
39	52.1712	-0.66621	98	52.18335	-0.692
40	52.17119	-0.66587	99	52.18386	-0.69141

Receptor	Latitude (°)	Longitude (°)	Receptor	Latitude (°)	Longitude (°)
41	52.17126	-0.66572	100	52.18859	-0.69231
42	52.17129	-0.66556	101	52.18883	-0.69513
43	52.17125	-0.66534	102*	52.20174	-0.69108
44	52.17065	-0.66813	103	52.17771	-0.69062
45	52.17082	-0.66815	104	52.17665	-0.68638
46	52.17087	-0.66796	105	52.17946	-0.65986
47	52.17087	-0.66775	106	52.17957	-0.66014
48	52.17087	-0.66761	107	52.17988	-0.66265
49	52.17087	-0.66748	108	52.1739	-0.66633
50	52.17101	-0.66724	109	52.1739	-0.66515
51	52.1711	-0.66708	110	52.17383	-0.66556
52	52.17103	-0.6668	111	52.17382	-0.66545
53	52.17112	-0.6669	112	52.17653	-0.68683
54	52.17488	-0.66086	113	52.17233	-0.68269
55	52.17446	-0.66348	114*	52.20014	-0.68033
56	52.17424	-0.6644	115*	52.20076	-0.68208
57	52.17455	-0.66327	116*	52.20039	-0.67964
58	52.17669	-0.66101	117*	52.2017	-0.68961
59	52.17682	-0.66103	118	52.19498	-0.68295
*Receptors shared with Green Hill F					

Appendix B: Road Receptor Details

A4500

Receptor	Latitude (°)	Longitude (°)	Receptor	Latitude (°)	Longitude (°)
1	52.27058	-0.77102	14	52.27597	-0.74689
2	52.27092	-0.76956	15	52.27619	-0.74644
3	52.27137	-0.76689	16	52.27714	-0.74503
4	52.2723	-0.76333	17	52.27766	-0.74451
5	52.27264	-0.7619	18	52.27828	-0.74358
6	52.27299	-0.7603	19	52.27941	-0.74102
7	52.27353	-0.75801	20	52.28039	-0.73845
8	52.27376	-0.75675	21	52.28121	-0.73655
9	52.27428	-0.75345	22	52.28184	-0.73547
10	52.27478	-0.75074	23	52.28204	-0.73512
11	52.27512	-0.74942	24	52.28232	-0.73449
12	52.2755	-0.74816	25	52.28259	-0.73383
13	52.27577	-0.74732	-	-	-

B573

Receptor	Latitude (°)	Longitude (°)	Receptor	Latitude (°)	Longitude (°)
1	52.26537	-0.75881	9	52.26947	-0.75753
2	52.26597	-0.75807	10	52.27012	-0.758
3	52.26608	-0.75791	11	52.27052	-0.75842
4	52.2664	-0.75755	12	52.27117	-0.75931
5	52.26677	-0.75725	13	52.27175	-0.76025
6	52.26729	-0.75709	14	52.27261	-0.762
7	52.26787	-0.75704	15	52.27261	-0.762
8	52.2687	-0.75714	-	-	-

A509 (Site F)

Receptor	Latitude (°)	Longitude (°)	Receptor	Latitude (°)	Longitude (°)
1	52.24409	-0.67554	17	52.22488	-0.68174
2	52.2433	-0.67542	18	52.22447	-0.68218
3	52.24203	-0.67543	19	52.22381	-0.68273
4	52.24001	-0.67554	20	52.22327	-0.68308
5	52.2391	-0.6757	21	52.22265	-0.68338
6	52.23791	-0.67587	22	52.22212	-0.68353
7	52.23668	-0.67629	23	52.22152	-0.68362
8	52.23572	-0.67633	24	52.22071	-0.68364
9	52.23198	-0.67625	25	52.21987	-0.68344
10	52.22985	-0.67631	26	52.21422	-0.6819
11	52.22928	-0.67648	27	52.21144	-0.68138
12	52.22875	-0.67675	28	52.20802	-0.68137
13	52.22732	-0.67783	29	52.19996	-0.68271
14	52.22626	-0.67964	30	52.19662	-0.68299
15	52.22572	-0.68058	31	52.19597	-0.68312
16	52.22515	-0.68141	-	-	-

A509 (Site G)

Receptor	Latitude (°)	Longitude (°)	Receptor	Latitude (°)	Longitude (°)
1	52.20455	-0.68195	12	52.1876	-0.68458
2	52.19997	-0.68271	13	52.18702	-0.68503
3	52.19678	-0.68295	14	52.18647	-0.6856
4	52.19602	-0.68311	15	52.18525	-0.68696
5	52.1958	-0.6832	16	52.18475	-0.68759
6	52.19388	-0.68407	17	52.18186	-0.68847
7	52.19318	-0.68425	18	52.18076	-0.68873
8	52.19199	-0.68432	19	52.18037	-0.68882
9	52.19059	-0.68428	20	52.17824	-0.68918
10	52.18891	-0.68416	21	52.17446	-0.68984
11	52.18838	-0.68422			

A428

Receptor	Latitude (°)	Longitude (°)	Receptor	Latitude (°)	Longitude (°)
1	52.18876	-0.69997	23	52.17721	-0.66981
2	52.18835	-0.69782	24	52.17618	-0.66841
3	52.18819	-0.69698	25	52.17488	-0.66642
4	52.18809	-0.69641	26	52.1744	-0.66565
5	52.18784	-0.69534	27	52.17414	-0.66506
6	52.1875	-0.69399	28	52.17394	-0.66444
7	52.18687	-0.69211	29	52.17386	-0.66409
8	52.18627	-0.6906	30	52.17379	-0.66365
9	52.18578	-0.68959	31	52.17374	-0.663
10	52.18511	-0.68828	32	52.17376	-0.6616
11	52.18416	-0.68639	33	52.17375	-0.66143
12	52.18352	-0.68518	34	52.17371	-0.66128
13	52.18201	-0.68219	35	52.17364	-0.66122
14	52.18173	-0.68158	36	52.17326	-0.66113
15	52.18126	-0.68053	37	52.17318	-0.66112
16	52.18092	-0.67968	38	52.17302	-0.66101
17	52.1804	-0.67833	39	52.17291	-0.66087
18	52.18	-0.67728	40	52.1728	-0.66065
19	52.17963	-0.67611	41	52.17271	-0.66031
20	52.17898	-0.67346	42	52.17268	-0.66011
21	52.1785	-0.67216	43	52.17245	-0.65869
22	52.17794	-0.67096	44	52.17235	-0.65828

Appendix C: Aviation Receptor Details

Sydwell Aerodrome Air Traffic Control Tower

Receptor	Latitude (°)	Longitude (°)
ATCT	52.30208	-0.79077

Sydwell Aerodrome Approach Path Observation Points

FP 14			FP 32		
Observation Point	Latitude (°)	Longitude (°)	Observation Point	Latitude (°)	Longitude (°)
OP1	52.30993	-0.79436	OP1	52.30496	-0.78587
OP2	52.31247	-0.79855	OP2	52.30271	-0.78118
OP3	52.31499	-0.80273	OP3	52.30057	-0.77671
OP4	52.31756	-0.80696	OP4	52.29828	-0.77194
OP5	52.3201	-0.81116	OP5	52.29605	-0.76729
OP6	52.32264	-0.81535	OP6	52.29382	-0.76264
OP7	52.32517	-0.81954	OP7	52.29159	-0.758
OP8	52.32772	-0.82376	OP8	52.28937	-0.75337
OP9	52.33028	-0.82799	OP9	52.2871	-0.74864

FP 23			FP 05		
Observation Point	Latitude (°)	Longitude (°)	Observation Point	Latitude (°)	Longitude (°)
OP1	52.30617	-0.78675	OP1	52.30281	-0.79378
OP2	52.30812	-0.78188	OP2	52.30079	-0.79865
OP3	52.31011	-0.77692	OP3	52.29878	-0.80352
OP4	52.31208	-0.77198	OP4	52.29676	-0.80843
OP5	52.31406	-0.76702	OP5	52.29474	-0.81332
OP6	52.31603	-0.7621	OP6	52.29271	-0.81822
OP7	52.31802	-0.75713	OP7	52.29069	-0.82311
OP8	52.31999	-0.7522	OP8	52.28867	-0.828
OP9	52.32201	-0.74716	OP9	52.28661	-0.83299

FP 21L			FP 03R		
Observation Point	Latitude (°)	Longitude (°)	Observation Point	Latitude (°)	Longitude (°)
OP1	52.30786	-0.78937	OP1	52.30239	-0.79345
OP2	52.31117	-0.78687	OP2	52.29904	-0.79571
OP3	52.31444	-0.78441	OP3	52.2957	-0.79796
OP4	52.31771	-0.78192	OP4	52.29236	-0.80021
OP5	52.321	-0.77942	OP5	52.28902	-0.80246
OP6	52.32429	-0.77693	OP6	52.28568	-0.80472
OP7	52.32753	-0.77448	OP7	52.28233	-0.80697
OP8	52.33082	-0.77198	OP8	52.27899	-0.80922
OP9	52.33411	-0.7695	OP9	52.27566	-0.81147

FP 21R			FP 03L		
Observation Point	Latitude (°)	Longitude (°)	Observation Point	Latitude (°)	Longitude (°)
OP1	52.30948	-0.78986	OP1	52.3025	-0.79506
OP2	52.31279	-0.78735	OP2	52.29919	-0.79744
OP3	52.31601	-0.7849	OP3	52.29587	-0.79981
OP4	52.31931	-0.78237	OP4	52.29257	-0.80219
OP5	52.32259	-0.77987	OP5	52.28926	-0.80456
OP6	52.32586	-0.77737	OP6	52.28595	-0.80693
OP7	52.32914	-0.77487	OP7	52.28263	-0.80931

FP 21R			FP 03L		
Observation Point	Latitude (°)	Longitude (°)	Observation Point	Latitude (°)	Longitude (°)
OP8	52.33241	-0.77237	OP8	52.27932	-0.81169
OP9	52.33568	-0.76987	OP9	52.27601	-0.81405

Easton Maudit Airstrip Approach Path Observation Points

North Approach Path			South Approach Path		
Observation Point	Latitude (°)	Longitude (°)	Observation Point	Latitude (°)	Longitude (°)
OP1	52.21575	-0.70312	OP1	52.21127	-0.69992
OP2	52.21891	-0.70591	OP2	52.20795	-0.69743
OP3	52.22212	-0.70873	OP3	52.20471	-0.69499
OP4	52.2253	-0.71153	OP4	52.20142	-0.69252
OP5	52.22848	-0.71433	OP5	52.19813	-0.69006
OP6	52.23164	-0.71711	OP6	52.19485	-0.6876
OP7	52.23485	-0.71994	OP7	52.19154	-0.68512
OP8	52.23802	-0.72273	OP8	52.18829	-0.68268
OP9	52.2412	-0.72553	OP9	52.185	-0.68022

William Pitt's Airstrip Approach Path Observation Points

FP 02			FP 20		
Observation Point	Latitude (°)	Longitude (°)	Observation Point	Latitude (°)	Longitude (°)
OP1	52.29418	-0.76261	OP1	52.29723	-0.76068
OP2	52.29081	-0.76476	OP2	52.30064	-0.75882
OP3	52.28745	-0.76692	OP3	52.30408	-0.75695
OP4	52.28409	-0.76907	OP4	52.30751	-0.75509
OP5	52.28071	-0.77124	OP5	52.31096	-0.75321
OP6	52.27735	-0.77339	OP6	52.31438	-0.75135
OP7	52.27398	-0.77554	OP7	52.31781	-0.74949
OP8	52.27061	-0.77771	OP8	52.32123	-0.74763
OP9	52.26726	-0.77985	OP9	52.32467	-0.74576

Tower Farm Airstrip Approach Path Observation Points

East Approach Path			West Approach Path		
Observation Point	Latitude (°)	Longitude (°)	Observation Point	Latitude (°)	Longitude (°)
OP1	52.25936	-0.65982	OP1	52.25972	-0.65157
OP2	52.25909	-0.6657	OP2	52.25999	-0.6457
OP3	52.25882	-0.67158	OP3	52.26026	-0.63982
OP4	52.25854	-0.67746	OP4	52.26053	-0.63394
OP5	52.25827	-0.68333	OP5	52.2608	-0.62806
OP6	52.258	-0.68921	OP6	52.26107	-0.62219
OP7	52.25772	-0.69509	OP7	52.26134	-0.61631
OP8	52.25745	-0.70096	OP8	52.26161	-0.61043
OP9	52.25718	-0.70684	OP9	52.26188	-0.60455

Pitsford Airstrip Approach Path Observation Points

FP 29			FP 11		
Observation Point	Latitude (°)	Longitude (°)	Observation Point	Latitude (°)	Longitude (°)
OP1	52.31466	-0.86888	OP1	52.31611	-0.87539
OP2	52.31335	-0.86337	OP2	52.31742	-0.88089
OP3	52.31205	-0.85787	OP3	52.31872	-0.8864
OP4	52.31074	-0.85236	OP4	52.32002	-0.8919

FP 29			FP 11		
Observation Point	Latitude (°)	Longitude (°)	Observation Point	Latitude (°)	Longitude (°)
OP5	52.30944	-0.84686	OP5	52.32133	-0.89741
OP6	52.30813	-0.84136	OP6	52.32263	-0.90291
OP7	52.30682	-0.83586	OP7	52.32393	-0.90842
OP8	52.30552	-0.83035	OP8	52.32524	-0.91393
OP9	52.30421	-0.82485	OP9	52.32654	-0.91943

Hold Farm Airstrip Approach Path Observation Points

East Approach Path			West Approach Path		
Observation Point	Latitude (°)	Longitude (°)	Observation Point	Latitude (°)	Longitude (°)
OP1	52.34304	-0.77974	OP1	52.34219	-0.78578
OP2	52.34381	-0.77397	OP2	52.34143	-0.79155
OP3	52.34458	-0.7682	OP3	52.34066	-0.79732
OP4	52.34534	-0.76242	OP4	52.33988	-0.80309
OP5	52.34611	-0.75665	OP5	52.33911	-0.80886
OP6	52.34688	-0.75088	OP6	52.33834	-0.81463
OP7	52.34765	-0.74511	OP7	52.33757	-0.8204
OP8	52.34842	-0.73934	OP8	52.3368	-0.82617
OP9	52.34918	-0.73357	OP9	52.33603	-0.83194

Green Hill Solar Farm

EIA Scoping Report

Appendix 16: Electromagnetic Fields

Revision A

Prepared by: PagerPower

Date: July 2024

PINS reference: EN010170

High-Level Electromagnetic Field Assessment

Green Hill Solar Farm

July 2024

PLANNING SOLUTIONS FOR:

- Solar
- Telecoms
- Railways
- Defence
- Buildings
- Wind
- Airports
- Radar
- Mitigation

www.pagerpower.com



ADMINISTRATION PAGE

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Issue	Date	Detail of Changes
1	March 2024	Initial issue
2	May 2024	Consideration of the updated electrical design
3	June 2024	Minor amendments
4	July 2024	Minor amendments

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EXECUTIVE SUMMARY

Report Purpose

Pager Power has been retained to assess the potential electromagnetic fields generated by electrical equipment within a ground-mounted solar photovoltaic development with respect to safe levels for human exposure. The proposed development is located between Northampton and Wellingborough, Northamptonshire, England, and will include underground power cables, transformers, photovoltaic (PV) inverters, substations and Battery Energy Storage System (BESS)¹.

Emissions

All electrical equipment emits electric and magnetic radiation. Power cables produce both electric and magnetic fields which can potentially affect human health. Radiation from underground cables is generally less than radiation from overhead powerlines because emissions from adjacent conductors within a cable tend to cancel each other out. When assessing the impacts of overhead power lines, it is important to consider the impact of both electric and magnetic fields. Underground cables generally cause a negligible electric field above ground but can cause a significant magnetic field which is dependent on the current in the conductors.

Standards in the UK

The UK Policy on public exposure limits to EMF radiation is designed to comply with the 1998 ICNIRP (International Commission on the Non-Ionizing Radiation Protection) guidelines in terms of the 1999 EU Recommendation. In 2010 ICNIRP produced new guidelines but these have not yet been incorporated into UK Policy. The public exposure limits in UK policy define reference levels for electric and magnetic fields. Where field levels exceed these reference levels in significantly occupied spaces, further investigation is warranted. Further information can be found in section 3 of the report.

Overall Conclusion

Maximum levels of electromagnetic radiation from the proposed underground cables are predicted to be below ICNIRP reference levels for magnetic fields.

Radiation from the transformers and PV inverters will be even less significant because the equipment is typically housed in protective enclosures and the transformers and PV inverters will be CE marked, meaning they should not generate or be affected by electromagnetic disturbance.

Additionally, radiation from the substations and BESS will not be significant as they will be located at least 100m from any surrounding dwellings and workplaces. For users of Public Rights

¹ The maximum voltages and potential locations for all underground cables, transformers/PV inverters and BESS have been considered to account for a worst-case scenario in the absence of a finalised electrical design of the site.

of Way (PRoWs), any radiation effects would likely be minimal as these are not continually occupied, rather they are moving receptors, as opposed to residential dwellings and workplaces.

Conclusions – 11kV to 400kV Underground Cables

The maximum magnetic field produced by the proposed underground cables (ranging from 11kV to 400kV) is predicted to be 96.17 micro-Tesla. Therefore, the magnetic field levels are below the reference level from the public exposure limits in UK policy (100 micro-Tesla). External electric fields are not produced by underground cables so have not been considered.

The electrical design is considering up to four high-voltage cables along certain sections of the cable route. This could lead to a cumulative effect on the resulting magnetic field intensity. As the voltages and number of cables within the cable trenches are yet to be confirmed for the Scheme, there is insufficient information to prove that the reference limits would not be exceeded. Further consideration is recommended once these details are confirmed.

Conclusions - Transformers, and PV Inverters

Notable sources of radiation other than the cables will be the transformers/PV inverters positioned across the proposed development.

The transformers and PV inverters will be 'CE' marked. CE marking indicates that a product has been assessed by the manufacturer and deemed to meet European Union safety, health and environmental protection requirements. CE marking requirements have been adopted and extended indefinitely in Great Britain. The CE marking should ensure that electrical and electronic equipment does not generate, or is not unintentionally affected by, electromagnetic disturbance.

Furthermore, the transformers and PV inverters are predicted to produce fields at a lower level than that of underground cables because the equipment is typically housed in protective enclosures.

Conclusions - Substations and BESS

The Scheme will connect to Grendon Substation (an existing National Grid distribution substation). According to UK regulation, the substation conforms with the applicable exposure limitations for the general public, and the field from the equipment inside a substation does not extend far, if at all, outside the perimeter fence. Additionally, the Scheme will include connection to up to two 400kV substations, along with numerous 132kV and 33kV substations throughout the Scheme. These substations are expected to be 'CE' marked and housed in protective enclosures, and thus predicted to produce fields at a lower level than that of underground cables.

The BESS contributes to the electromagnetic radiation produced by the proposed development. The favoured site for the BESS is Green Hill BESS surrounding Grendon Substation, which encompasses three potential locations. When evaluating all three proposed BESS locations surrounding Grendon Substation, the closest dwelling is over 175m away. Furthermore, other potential sites under consideration for the BESS are Sites A, B, C, E, F, and G, and the location of the BESS within these sites will be located no closer than 100m from any dwelling or workplaces. For users of PRoWs, any radiation effects would likely be minimal as these are not continually occupied, rather they are moving receptors, as opposed to residential dwellings and workplaces.

As electromagnetic radiation levels reduce with increased distance, all nearby dwellings and work places are expected to be situated at a safe distance from the BESS installations.

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ABOUT PAGER POWER

Pager Power is a dedicated consultancy company based in Suffolk, UK. The company has undertaken projects in 59 countries internationally.

The company comprises a team of experts to provide technical expertise and guidance on a range of planning issues for large and small developments.

Pager Power was established in 1997. Initially the company focus was on modelling the impact of wind turbines on radar systems. Over the years, the company has expanded into numerous fields including:

- Renewable energy projects.
- Building developments.
- Aviation and telecommunication systems.

Pager Power prides itself on providing comprehensive, understandable, and accurate assessments of complex issues in line with national and international standards. This is underpinned by its custom software, longstanding relationships with stakeholders and active role in conferences and research efforts around the world.

Pager Power's assessments withstand legal scrutiny and the company can provide support for a project at any stage.

1 INTRODUCTION

1.1 Purpose of the Study

Pager Power has been retained to assess the potential electromagnetic fields generated by electrical equipment within a fixed ground-mounted solar photovoltaic development, with respect to safe levels for human exposure. The proposed development is located between Northampton and Wellingborough, Northamptonshire, England, and will consist of underground power cables, transformers, photovoltaic (PV) inverters, substations and Battery Energy Storage System (BESS)².

1.2 Proposed Development Site Areas

Figure 1 below shows the site areas (dark blue polygons) and cable search area (light blue polygons) for the proposed development.

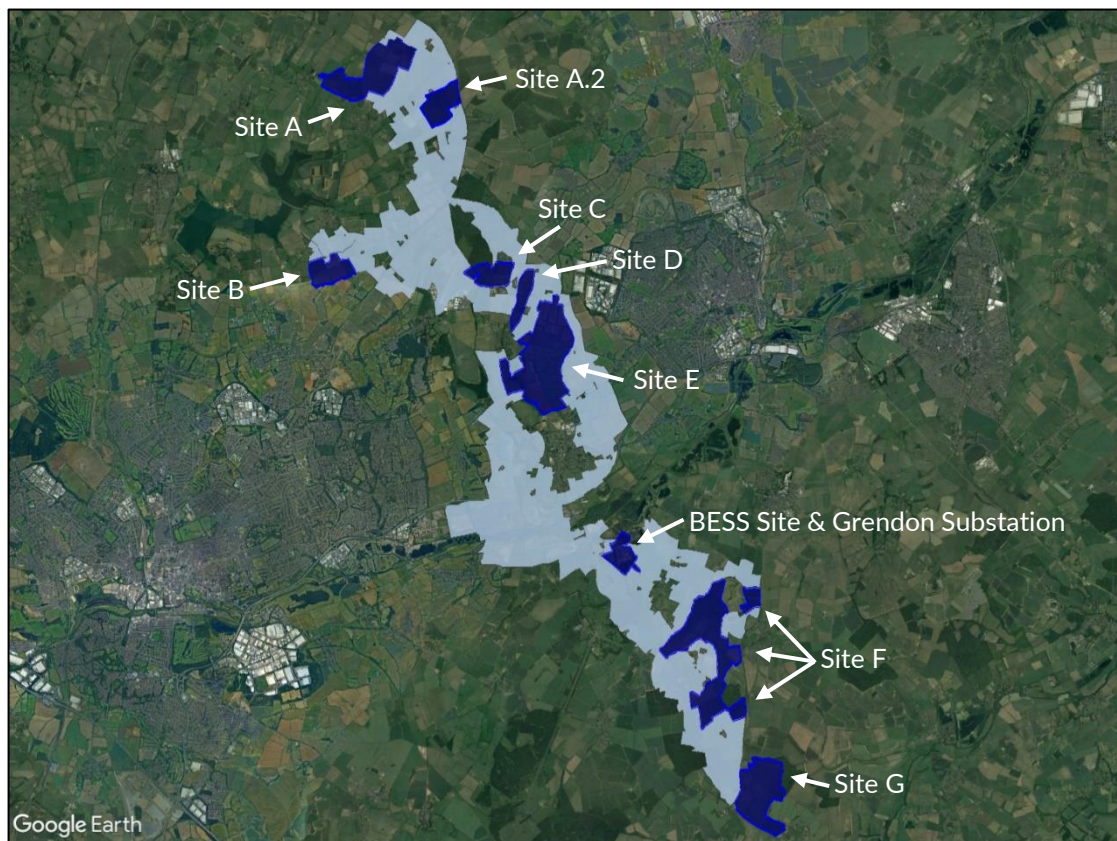


Figure 1 Proposed development site areas

² The maximum voltages and potential locations for all underground cables, transformers/PV inverters and BESS have been considered to account for a worst-case scenario in the absence of a finalised electrical design of the site.

1.3 Assessed Infrastructure

The known locations of assessed infrastructure are shown in Figure 2³ below:

- Maximum proposed solar array footprint (red polygons);
- All proposed underground cable routes (blue area denotes overall Cable Route Search Area within which the underground cables would be located).

Figure 2 is intended to provide an overview of the environment and infrastructure.

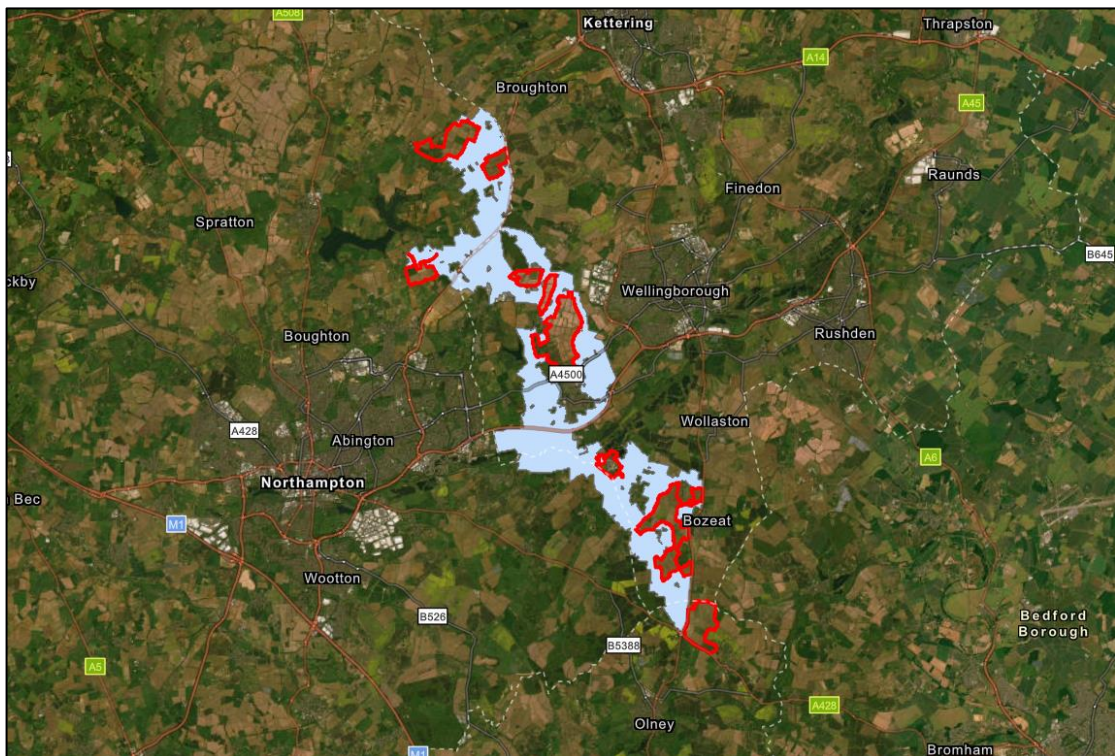


Figure 2 Assessed infrastructure locations

The technical information considered within this assessment is presented in Table 1 below and on the following page. Information in *italics* is to be confirmed and are subject to change as design progresses. This table should be read in conjunction with Chapter 4 Scheme Description of the Scoping Report.

Assessed Infrastructure Technical Information		
Underground cables	Voltages	11kV to 400kV cables
	Locations	Within the search area highlighted in Figure 2

³ Source 

Assessed Infrastructure Technical Information			
	Minimum Depth	0.75m - subject to design and ground conditions	
Substations	Voltages	Up to two 400kV substations, and a number of 132kV and 33kV substations	
	Proposed locations	33kV	Site C, D and E ⁴
		132kV	Sites A, A.2, B and G Site F
		400kV	Existing Grendon Substation Sites C, E or F and BESS site
BESS	Proposed locations	Sites A, B, C, E, BESS Site (preferred), F or G	
Conversion Units (Transformers and PV inverters)	Proposed locations	Positioned across the proposed development	

Table 1 Assessed infrastructure technical information

⁴ The locations of 33kV substations will be determined by the final location of the 400kV substation. Site C and/or Site E will require 33kV substations based on which site does not house the 400kV substation.

2 TECHNICAL BACKGROUND

2.1 Emissions

All electrical equipment emits electric and magnetic radiation. Power cables produce both electric and magnetic fields which can potentially affect human health. Radiation from underground cables is generally less than radiation from overhead lines because emissions from adjacent conductors within a cable tend to cancel each other out. When assessing the impacts of overhead powerlines, it is important to consider the impact of both electric and magnetic fields.

Underground cables generally cause a negligible electric field above ground but can cause a significant magnetic field which is dependent on the current in the conductors.

2.2 Electromagnetism

The movement of electric charge causes electric and magnetic fields to be produced in the space surrounding the charge. Human exposure to such fields can cause health problems if persistent and/or they are of high strength. The magnitude of the effects is dependent on both the field strength and the exposure time.

2.3 Health Concerns – Potential Effects

The potential effects on human health caused by time-varying magnetic fields, such as those generated by AC⁵ cables, are due to induced current on functions of the central nervous system. There are various international bodies which provide maximum safe exposure levels to time varying electromagnetic fields.

Various sources of information relating to safe exposure levels have been reviewed as part of this study.

The UK Policy on public exposure limits to EMF radiation is designed to comply with the 1998 ICNIRP (International Commission on the Non-Ionizing Radiation Protection) guidelines in terms of the 1999 EU Recommendation. In 2010 ICNIRP produced new guidelines but these have not yet been incorporated into UK Policy. The public exposure limits in UK policy define reference levels for electric and magnetic fields. Where field levels exceed these reference levels in significantly occupied spaces, further investigation is warranted.

Another relevant resource consulted is the EMFs.info webpage, where the UK electricity industry have collected the relevant studies pertaining to safe limits on exposure in the UK and elsewhere in the world. The relevant sections are analysed in the next chapter.

2.4 Radiation from Home Electrical Equipment

The World Health Organization (WHO) publishes data regarding electromagnetic fields including the following typical levels for home electrical equipment, shown in Table 1 below.

⁵ Alternating Current

Appliance	Electric field strength (Volts per metre)	Magnetic field strength (micro-Tesla) (at 1 metre)
Hair Dryer	80	0.01 – 7
Iron	120	0.12 – 0.3
Vacuum Cleaner	50	2 – 20
Refrigerator	120	0.01 – 0.25
Television	60	0.04 – 2

Table 2 *Typical emissions from home electrical equipment*

2.5 Radiation Reduction with Distance

Radiation levels reduce with distance which means, for example, the typical magnetic field from a vacuum cleaner reduces from 800 micro-Tesla to 2 micro-Tesla when the separation distance increases from 3 centimetres to 100 centimetres.

This means radiation levels from the cables, transformers, PV inverters, substations and BESS will tend to reduce with distance in any direction – including towards a receptor.

3 OVERVIEW OF ELECTROMAGNETIC FIELDS

3.1 Overview

The Electricity Networks Association⁶ provides a comprehensive overview of electromagnetic fields (EMFs) and the issues associated with these on their webpage⁷. Regarding health issues caused by EMFs they state the following:

However, there are suggestions that magnetic fields may cause other diseases, principally childhood leukaemia, at levels below these limits. The evidence for this comes from epidemiology studies, which have found a statistical association - an apparent two-fold increase in leukaemia incidence, from about 1 in 24,000 per year up to 1 in 12,000 per year, for the children with the top half percent of exposures. The evidence is strong enough for magnetic fields to be classified by the World Health Organization as "possibly carcinogenic". But because these studies only show statistical associations and do not demonstrate causation, and because the evidence from the laboratory is against, the risk is not established, it remains only a possibility.

3.2 Exposure limits in the UK

As set out in the previous section, the limits in the UK come from the 1998 ICNIRP guidelines. The original guidance in 1999 specified:

i) Basic Restrictions

These are the levels at which radiation is potentially harmful to humans. This is a current density⁸ given in mA m⁻² (milliamps per metre squared).

ii) Reference Level (Investigation Level)

Provided for practical exposure assessment purposes to determine whether the basic restrictions are likely to be exceeded. Compliance with the reference level will ensure compliance with the relevant basic restriction.

iii) Field Actually Required

This is the field strength at which the basic restriction is likely to be exceeded.

The values for the above stated in the ICNIRP 1998 paper are shown in Table 3 on the following page. These are the public exposure values, not the occupational exposure values – the former is more conservative than the latter by a factor of five.

⁶ This is an industry body for the companies which run the UK and Ireland's energy networks. The group comprises 14 members including National Grid.

⁷ 

⁸ Current density is the amount of electric current flowing through a unit area.

ICNIRP 1998 – Public Exposure Limits				
Basic Restriction (mA m ⁻²)	Magnetic Fields Reference Level (μT)	Electric Fields Reference Level (kV m ⁻¹)	Magnetic Field Actually Required to Exceed Basic Restriction (μT)	Electric Field Actually Required to Exceed Basic Restriction (kV m ⁻¹)
2	100	5	360	9

Table 3 ICNIRP Exposure Limits 1998

The levels in Table 2 will be considered within this analysis.

3.3 Height Above Ground Used for Testing Compliance

EMFs.info specifically states the following with regard to the height to be used to test compliance:

The standard height for measuring fields, especially from power lines, is 1 m above ground level ... This isn't just because it's a convenient round number, it's because roughly half way up the height of a standing person is actually the height that gives the best approximation to the induced current in the body.

3.4 Safe Levels – Summary

The values of interest are those shown in Table 3 above. Effectively, this means that in locations of significant exposure time, such as residences, levels should be below:

- 100μT (magnetic fields).
- 5kV m⁻¹ (electric fields).

Values exceeding the limits above, at one metre above ground level, would suggest that further investigation is required.

4 TECHNICAL ASSESSMENT

4.1 Field Levels – Underground Cables

Field level data from various cable configurations have been sourced from EMFS.info. The data below and on the following page shows the magnetic fields for 400kV cables, which represent the maximum assumed voltage for underground cables in the proposed development, considering a worst-case scenario. Typical values for magnetic fields are approximately a quarter of these maximum values⁹. The assessment accounts for varying cable voltages in the proposed development, with the analysis based on the maximum and shallowest depths to adopt a conservative approach. Maximum field data has been used where possible to provide a more conservative assessment. It's important to note that there are no electric fields above ground associated with underground cables. The relevant chart is shown in Figure 3 below. Table 4 on the following page provides the associated indicative numerical values at set distances.

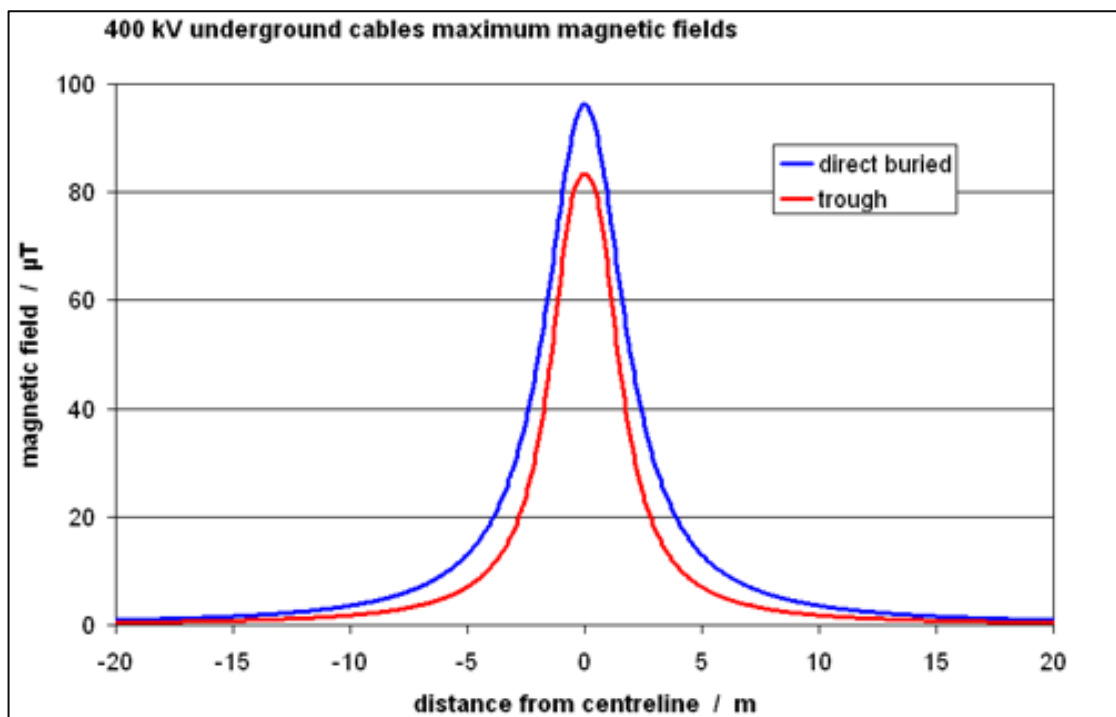


Figure 3 Maximum magnetic fields associated with 400kV underground cables

⁹ Source 

Distance from Centreline (m)	Magnetic Field (trough double circuit cable with 0.13m spacing and 0.3m depth)	Magnetic Field (direct buried single cable with 0.5m spacing and 0.9m depth) ¹⁰
0	83.30 micro Teslas	96.17 micro Teslas
5	7.01 micro Teslas	13.05 micro Teslas
10	1.82 micro Teslas	3.58 micro Teslas
20	0.46 micro Teslas	0.92 micro Teslas

Table 4 Maximum magnetic field levels for an underground 400kV cable (source: EMFS.info)

4.2 Recommended Minimum Clearance Distances

The recommended minimum clearance distances for underground cables based on the public exposure limits previously referenced in this report for magnetic and electric fields are presented in Table 5 below.

The dataset provided maximum values and typical values for the configurations that have been evaluated – in all cases the ‘maximum’ option has been chosen where possible in order to remain conservative.

Type of Line	Recommended minimum Clearance Distance (m)	Estimated Maximum Magnetic Field (micro-Tesla)	Estimated Maximum Electric Field (kV/m)
400kV underground cable	None	96.17 (below 100 limit)	-

Table 5 Recommended minimum clearance distances for the 400kV underground cables

This shows that clearance distances are not required for any proposed underground cables. The table highlights that the maximum fields produced by the cables are below the acceptable exposure limit and significant effects upon human health are not predicted.

¹⁰ This cable was used for the assessment in the following sections.

4.3 Radiation from Other Sources

4.3.1 Transformers and PV Inverters

Notable sources of radiation, other than the underground cables, will include the transformers and PV inverters positioned across the proposed development. As of the time of this report, the specific locations for these have not been finalised.

The transformers and PV inverters should be CE marked. CE marking indicates that a product has been assessed by the manufacturer and deemed to meet European Union safety, health and environmental protection requirements¹¹. CE marking requirements have been adopted and extended indefinitely in Great Britain. This will be confirmed prior to installation.

In this case, the relevant EU Directive for CE marking is¹² Electromagnetic Compatibility Directive 2014/30/EU, which should ensure that electrical and electronic equipment should not generate, or be affected by, electromagnetic disturbance.

Additionally, the transformers and PV inverters are also predicted to produce fields at a lower level than that of underground cables as the equipment will be housed in a protective enclosures.

4.3.2 Substations and BESS

Other notable sources of radiation associated with the proposed development include the substations and BESS. The favoured site for the BESS is Green Hill BESS Site surrounding Grendon Substation, which encompasses three potential locations. Other potential sites under consideration for the BESS are Sites A, B, C, E, F, and G.

Furthermore, as detailed in Table 1 within Section 1.3, the Scheme will include connection to Grendon Substation (an existing National Grid substation) and up to two 400kV substations, along with numerous 132kV and 33kV substations throughout the Scheme.

A detailed overview of the potential BESS locations (orange) and Grendon Substation (green) within BESS Site can be found in Figures 4 to 7 on the following pages. The light blue shaded polygons represent the cable search area for the proposed development.

¹¹ Source: [REDACTED]

¹² [REDACTED]



Figure 4 Proposed locations for the BESS at the BESS Site around Grendon Substation

The minimum horizontal distance between BESS 1 and any dwelling is approximately 400m, 175m between BESS 2 and any dwelling, and 400m between BESS 3 and any dwelling. This is illustrated in Figures 5 to 7 on the following pages. Within these figures, the square icons show the positions of existing pylons. Based on a desk-based review of imagery, these are likely to be 400kV pylons. 400kV overhead cabling would produce more significant electric and magnetic fields than any type of electrical infrastructure proposed as a part of this development.



Figure 5 Minimum distance between BESS 1 and the nearest dwelling



Figure 6 Minimum distance between BESS 2 and the nearest dwelling, as well as the relative location of Grendon Substation



Figure 7 Minimum distance between BESS 3 and the nearest dwellings

The most significant source of radiation for these dwellings is the existing overhead lines¹³ connecting to Grendon Substation. These dwellings are already considerably close to the existing substation and are in even closer proximity to the existing overhead power cables, which are a much more significant source of radiation. Additionally, the magnetic fields from the proposed underground cable routes have been assessed accordingly within this report for the nearest dwelling locations.

Similarly to the transformers and PV inverters, the additional and alternative proposed substations, ranging from 33kV to 400kV, are expected to be 'CE' marked. CE marking should ensure that electrical and electronic equipment does not generate, or is not unintentionally affected by, electromagnetic disturbance. The substations are also predicted to produce fields at a lower level than that of underground cables because the equipment is expected to be housed in protective enclosures.

Significant radiation is not predicted from the existing substation, proposed substations and BESS because:

- Grendon Substation is more than 300 metres from any dwelling and would be required to comply with the relevant exposure limits for the general public, and the electromagnetic fields from the equipment inside a substation do not extend far if at all outside the perimeter fence.
- The potential BESS locations in Green Hill BESS are all more than 175 metres from any dwelling, meaning that all dwellings are at a safe distance as electromagnetic radiation levels reduce as the separation distance increases.

¹³ Understood to be 400kV

- The developer has confirmed that any additional and alternative proposed substations and BESS locations will be located no closer than 100m to any nearby residential dwelling and workplaces.
- For users of Public Rights of Way (PRoWs), any radiation effects would likely be minimal as these are not continually occupied, rather they are moving receptors, as opposed to residential dwellings and workplaces.

4.4 Comparative Assessment

The maximum magnetic field produced by household appliances like vacuum cleaners can reach up to 50 micro-Tesla¹⁴. It would follow that appliances with higher voltages would generate stronger magnetic fields. For instance, the proposed underground cables are projected to produce a maximum magnetic field of 96.17 micro-Tesla. While this value is notably higher than that of household appliances, it remains within acceptable exposure limits. Notably, the magnetic field strength is expected to drop to approximately 13 micro-Tesla just 5 meters from the source for 400kV cables less than 1 meter deep; a value even less than that of a vacuum cleaner. With the confirmed depth of the high voltage 400kV underground cables being around 1.2 meters for the proposed development, a likely reduction in the strength of the magnetic field is predicted.

Moreover, the transformers and PV inverters will produce magnetic fields at levels lower than the underground cables.

4.5 Cumulative Effects

When assessing the cumulative effects of electromagnetic fields, the worst case is based upon the addition of source a and source b; however, it is important to note that this is only true for magnetic fields that are exactly in line. When the electromagnetic fields are not in line, the sum of these is less than 'a+b'.

For the purpose of this assessment the worst case has been calculated i.e. based upon 'a+b'. As there are no proposed overhead powerlines to consider for the proposed development, there are no cumulative effects to assess of this regard.

As discussed in Section 4.3, the transformers, PV inverters, substations and BESS produce smaller magnetic fields than that of the underground cables, thus, considering all sources of radiation and their relative locations, it is predicted that the cumulative magnetic and electric fields are likely to be below the acceptable exposure limits.

The cumulative effects are not significantly impacted by the use of household items. Electrical household appliances will add to the overall exposure of electromagnetic fields; however, these levels will still remain below the recommended exposure limit, due to the lower voltages of the appliances, and are not used constantly, providing only a temporary addition to the resultant electromagnetic field levels.

¹⁴ Source: 



It is not expected that there will be any significant cumulative effects with other known solar schemes. This is because of the substantial distances between the developments and the absence of any known possibility for high-voltage cables to overlap.

The electrical design is considering up to four high-voltage cables along certain sections of the cable route. This could lead to a cumulative effect on the resulting magnetic field intensity. As the voltages and number of cables within the cable trenches are yet to be confirmed for the Scheme, there is insufficient information to prove that the reference limits would not be exceeded. Further consideration is recommended once these details are confirmed.

5 CONCLUSIONS

5.1 11kV to 400kV Underground Cables

The maximum magnetic field produced by the proposed underground cables (ranging from 11kV to 400kV) is predicted to be 96.17 micro-Tesla. Therefore, the magnetic field levels are below the reference level from the public exposure limits in UK policy (100 micro-Tesla). External electric fields are not produced by underground cables so have not been considered.

The electrical design is considering up to four high-voltage cables along certain sections of the cable route. This could lead to a cumulative effect on the resulting magnetic field intensity. As the voltages and number of cables within the cable trenches are yet to be confirmed for the Scheme, there is insufficient information to prove that the reference limits would not be exceeded. Further consideration is recommended once these details are confirmed.

5.2 Transformers, and PV Inverters

Notable sources of radiation other than the cables will be the transformers/PV inverters positioned across the proposed development.

The transformers and PV inverters should be 'CE' marked. CE marking indicates that a product has been assessed by the manufacturer and deemed to meet European Union safety, health and environmental protection requirements. CE marking requirements have been adopted and extended indefinitely in Great Britain. The CE marking should ensure that electrical and electronic equipment does not generate, or is not unintentionally affected by, electromagnetic disturbance.

The transformers and PV inverters are also predicted to produce fields at a lower level than that of underground cables because the equipment is typically housed in protective enclosures.

5.3 Substations and BESS

The Scheme will connect to Grendon Substation (an existing National Grid distribution substation). According to UK regulation, the substation conforms with the applicable exposure limitations for the general public, and the field from the equipment inside a substation does not extend far, if at all, outside the perimeter fence. Additionally, the Scheme will include connection to up to two 400kV substations, along with numerous 132kV and 33kV substations throughout the Scheme. These substations are expected to be 'CE' marked and housed in protective enclosures, and thus predicted to produce fields at a lower level than that of underground cables.

The BESS contributes to the electromagnetic radiation produced by the proposed development. The favoured site for the BESS is Green Hill BESS surrounding Grendon Substation, which encompasses three potential locations. When evaluating all three proposed BESS locations surrounding Grendon Substation, the closest dwelling is over 175m away. Furthermore, other potential sites under consideration for the BESS are Sites A, B, C, E, F, and G, and the location of the BESS within these sites will be located no closer than 100m from any dwelling or workplaces. For users of PRoWs, any radiation effects would likely be minimal as these are not continually

occupied, rather they are moving receptors, as opposed to residential dwellings and workplaces. As electromagnetic radiation levels reduce with increased distance, all nearby dwellings and work places are expected to be situated at a safe distance from the BESS installations.



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Green Hill Solar Farm

EIA Scoping Report

Appendix 18: Socio-Economics, Tourism and Recreation

Revision A

Prepared by: Lanpro Services

Date: July 2024

PINS reference: EN010170



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18.1 Introduction

- 18.1.1 For the purposes of assessing socio-economic, tourism and recreation effects, the Scheme – as defined at paragraph 1.1.1 of the EIA Scoping Report – are considered functionally and geographically in their entirety. The geographic extents of the Scheme, consisting of the Sites and Cable Route Search Area, are set out on the Location Plan at **Figure 3.1** and in more detail in **Figures 3.1.1-3.1.8**.

18.2 Socio-Economic Baseline Conditions

Resident Population

- 18.2.1 The Assessment Impact Area, which comprises the authority areas of Bedford Borough, Milton Keynes City, North Northamptonshire, and West Northamptonshire, had a combined population of 1,257,500 in 2021 (Ref 1). The proportion per authority area is as follows:
- Bedford: 185,200 – 14.7%
 - Milton Keynes: 287,100 – 22.8%
 - North Northamptonshire: 359,500 – 28.6%
 - West Northamptonshire: 425,700 – 33.9%
- 18.2.2 The population of the Assessment Impact Area is approximately 2.2% of the population of England, and 1.9% of the population of the United Kingdom (Ref 2, Ref 3).
- 18.2.3 National population projections estimate that the population of the United Kingdom will grow by approximately 3.8% between 2021 and 2028 (Ref 4), the projected earliest construction commencement date. Applying this assumption to the Assessment Impact Area, the population is likely to be approximately 1,305,000. The Scheme is proposed to operate for up to 60 years, with the proposed date of decommissioning of 2089 (for the purpose of this assessment). From 2021-2089, the national population is estimated to grow by 17.9%.
- 18.2.4 The age and sex demographic profile of the Assessment Impact Area will be detailed further in the ES, as will the projected changes to the demographic profile at the assessment area level and at the national level up to the end of the construction phase of the Scheme (estimated as up to 2031).
- 18.2.5 A baseline profile of population health and wellbeing is included in **Chapter 19: Human Health and Wellbeing** of this EIA Scoping Report.

Deprivation

- 18.2.6 The Indices of Multiple Deprivation 2019 provides the most up-to-date information regarding measures of population deprivation across England. The Assessment Impact Area falls across a total of nine former district areas that were used for assessment in 2019. Each area has the following rank of the 317 authority areas (where “1st” is the most deprived area in England) (Ref 5):
- Bedford – 156th
 - Milton Keynes – 172nd
 - North Northamptonshire:
 - Corby – 70th
 - Wellingborough – 124th
 - Kettering – 161st
 - East Northamptonshire – 226th
 - West Northamptonshire:



- Northampton – 105th
- Daventry – 243rd
- South Northamptonshire – 312th

18.2.7 The population of the Assessment Impact Area is more likely than the national average to be deprived of access to suitable education and skills attainment, and are more likely than the national average to have barriers to accessing suitable housing and services. Some parts of the Assessment Impact Area are also at risk of being more deprived than the national average in relation to health and crime, particularly within more urban areas.

18.2.8 Whilst there are significant deprivation inequalities present within the Assessment Impact Area, the Scheme itself and the majority of its Cable Route Search Area fall within Lower Super Output Areas that are in the 40% least deprived neighbourhoods in England (Ref 6).

Skills and Qualification Attainment

18.2.9 The qualification attainment rate within the Assessment Impact Area at the time of the December 2021 Annual Population Survey (Ref 7) indicated a significant variance in skills and qualification between the subject local authority areas. The proportion of the population of ages 16-64 years old achieving no qualifications is between 4.3-5.4%. This compares favourably to the UK national average of 6.8%. However, the Assessment Impact Area contains significant variation in attainment of NVQ Level 4 and higher qualification rates. This ranges from 29.4% in North Northamptonshire, up to 49.5% in Bedford, with an overall rate of 36.0%. This compares overall poorly to the UK national average rate of 43.5%. Generally, Bedford and Milton Keynes perform at or better than the national average, whilst North and West Northamptonshire both perform significantly worse in attainment of higher qualifications.

Employment and Economic Activity

18.2.10 The economically active population is defined as the members of the working age (16-64 year-old) population being in employment, and those who are seeking employment and are able for work. Economically inactive members of a population are predominantly categorised by retirement, those in full-time education not seeking employment, full-time carers of family members, and long-term sick and disabled people.

18.2.11 The September 2023 Annual Population Survey (Ref 8) indicates that the Assessment Impact Area has an economic activity rate of 81.1%, which is largely consistent across the four constituent authority areas (range from 80.7-81.6%). The overall area figure compares favourably to national rates (78.7%). Related to this, the employment rate of 16-64 year olds ranges from 77.2-79.0% across the Assessment Impact Area, totalling a labour market of 577,900 workers (78.1% of 16-64 year old population). This also compares favourably to the national average of 75.7%.

18.2.12 Of the economically active population, the September 2023 Annual Population Survey estimates a total of 22,900 people are unemployed within the Local Impact Area. This equates to 3.8% of the economically active population, which is consistent with the UK national rate of 3.8%. However, unemployment is uneven across the four authority areas, with North Northamptonshire (2.0%) and Milton Keynes (3.0%) performing significantly better than Bedford (4.9%) and West Northamptonshire (5.3%). Local and national trends point to a rise in unemployment over the last 12 months. A full review of trends in economic activity and unemployment at the local and national scale is likely to be required in the ES.

18.2.13 For residents within the Assessment Impact Area, the median annual gross salary for full-time workers (in 2023) was approximately £34,200. This is marginally lower than that of the UK of £35,000. There is however some considerable level of difference within the



Assessment Impact Area, with the median annual gross salary for residents in North Northamptonshire being some £5,000 less than those in Milton Keynes (Ref 9).

Working Population

- 18.2.14 The workplace population of the Assessment Impact Area was 634,600 in 2022 (Ref 10), some 8.7% greater than the population of residents in employment of 583,900 in December 2022 (Ref 11). This therefore demonstrates a net inflow of people to the Assessment Impact Area travelling for work.
- 18.2.15 Commuting data has not been collected due to the absence of up-to-date reliable baseline data. This is predominantly due to the Census 2021 being undertaken during the COVID-19 pandemic, during which official government guidance was to work from home where possible. As such, this data is unlikely to be reflective of the current (2024) conditions, nor those anticipated during the Scheme's construction (estimated 2027-2029).
- 18.2.16 For the workplace population within the Assessment Impact Area, the median annual gross salary for full-time workers (in 2023) was approximately £35,200. This is marginally higher than that of the UK of £35,000. As for residents, there are some considerable level of difference within the Assessment Impact Area, with the median annual gross salary for workers in North Northamptonshire earning some £8,700 less than those in Milton Keynes (Ref 12).

Business Sectors

- 18.2.17 The 2022 Business Register and Employment Survey (Ref 10) shows the largest business sector by percentage of employed workforce in the Assessment Impact Area is health (group Q) (12.4%), followed by transport and storage (group H) (9.6%), and business administration & support services (group N) (9.1%). The local transport and storage sector is significantly larger by business proportion than the national level, whilst the professional, scientific & technical (group M) sector is significantly smaller. Most other sectors are relatively consistent with national trends. This is not necessarily consistent across the Assessment Impact Area, with some significant outliers including the manufacturing industry in North Northamptonshire (significantly larger than average), and both the health and agriculture sectors in Milton Keynes (significantly smaller than average).
- 18.2.18 The South East Midlands Local Enterprise Partnership (SEMLEP) Local Industrial Strategy (LIS) (Ref 13) provides a strategic industrial and business context which has helped to form the evidence base for economic policy in the Assessment Impact Area. The LIS identifies aerospace and engineering as a key target business sector for ongoing development, whilst setting out key ambitions for promoting innovation, employment skill provision, productivity and sustainability.

18.3 Tourism and Recreation Baseline Conditions

- 18.3.1 The Local Impact Area falls across a number of authority areas, each with their own economic strategies for tourism and visitors. The Northamptonshire visitor economy is supported by key attractions which include heritage features such as Rockingham Castle in the 'county of spires and squires', country parks, the River Nene and Grand Union Canal, and motorsports venues at Silverstone, and Santa Pod Raceway in neighbouring Bedford Borough. These attractions brought over 18 million visitors to Northamptonshire in 2023, spending close to £1 billion, and supporting over 30,000 jobs (Ref.14). Likewise, the visitor economy for neighbouring Milton Keynes is built around attractions such as Bletchley Park, Milton Keynes' retail centres and sports facilities.
- 18.3.2 A number of the Sites as well as the Cable Route Search Area host a number of Public Rights of Way (see Figures 7.7.1-7.7.5 in **Appendix 7.1 Landscape Figures**), and are located nearby to a small number of long-distance recreational walking and cycling routes. The Northamptonshire Round crosses through Site C and Site E, and crosses the Cable Route Search Area between Hannington and Sywell Wood. The Nene Way is crossed by the Cable Route Search Area between Cogenhoe and Earls Barton. The



Milton Keynes Boundary Walk comes alongside part of the southern boundary of Site F and goes through Site G, wherein it meets the Three Shires Walk which traverses through the eastern side of Site G. Although not shown on OS maps, the Long Distance Walking Association (Ref 15) registers the Via Beata, which crosses the Cable Route Search Area on the same route as the Northamptonshire Round path, the Northamptonshire Boundary Walk which crosses through Site F between Bozeat and Easton Maudit, and the Buckinghamshire Way which runs through Site G on shared routes with the Milton Keynes Boundary Walk and Three Shires Way.

- 18.3.3 No long-distance cycle routes directly cross or border the Scheme. National Cycle Route 6 passes no closer than 4.0km to the west of Sites A and B, which National Cycle Route 539 comes within 3.0km of Site E (Ref 16).
- 18.3.4 The Scheme is located within an area containing a substantial number of recreational and navigable waterways. To the west of Sites A and B is Pitsford Water. Less than 0.5km to the west of Site E is Sywell Reservoir and Country Park. The River Nene is crossed by the Cable Route Search Area, with the surrounding river valley playing host to a large number of lakes for water sports and fishing. There are also a number of fishing lakes at Castle Ashby, less than 1km to the south of the grid connection point at Grendon Substation.
- 18.3.5 A full survey of the accessibility and navigability of waterways for recreational uses is continuing through ongoing dialogue with statutory stakeholders and through public consultation. Updated information will be made available in the final ES.
- 18.3.6 The area, villages and urban areas within theoretical visibility of the Scheme and on likely Scheme construction routes are home to a number of recreational facilities, including formal leisure and recreation facilities, sports venues, and informal and youth facilities. A full assessment of the potential impacts on access to these facilities during construction, and on their desirability and use during the construction and operational life of the Scheme will be undertaken in the final ES.
- 18.3.7 The Scheme is predominantly set within agricultural land, which due to its existing use, is not in itself a key tourist attraction or destination. The land does however play a role in providing a landscape context to recreational use of waterways and recreational pedestrian and cycling routes and trails. The potential impacts to the tourism and visitor economy are explored in this chapter, and will utilise assessment outcomes in relation to landscape-derived impacts from **Chapter 7: Landscape and Visual**, and heritage-derived impacts from **Chapter 13: Cultural Heritage**.

18.4 References

- Ref.1 ONS (2022). Census 2021: TS001 – Number of usual residents in households and communal establishments (2021). Available at NomisWeb.
- Ref.2 NISRA (2022). Census 2021 population and household estimates for Northern Ireland
- Ref.3 National Statistics Publication for Scotland (2023). Scotland's Census 2022 - Rounded population estimates
- Ref.4 ONS (2018). National population projections by single year of age (2018 base). Available at NomisWeb.
- Ref.5 MHCLG (2019). IoD2019 Interactive Dashboard – Local Authority Focus. Available at GOV.UK
- Ref.6 MHCLG (2019). Indices of Deprivation: 2019 and 2015 Mapping Browser. Available at dclgapps.communities.gov.uk
- Ref.7 ONS (2022). Annual Population Survey: 12 months to December 2021 – Qualification Rates. Available at NomisWeb.



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- Ref.8 ONS (2024). Annual Population Survey: 12 months to September 2023. Available at NomisWeb.
- Ref.9 ONS (2024). Annual Survey of Hours and Earnings – Resident Analysis. Available at NomisWeb.
- Ref.10 ONS (2023). 2022 Business Register and Employment Survey – Employment. Available at NomisWeb.
- Ref.11 ONS (2023). Annual Population Survey: 12 months to December 2022. Available at NomisWeb.
- Ref.12 ONS (2024). Annual Survey of Hours and Earnings – Workplace Analysis. Available at NomisWeb.
- Ref.13 SEMLEP (2019). South East Midlands Local Industrial Strategy. Cranfield: South East Midlands Local Enterprise Partnership.
- Ref.14 North Northamptonshire Council (2024). Northamptonshire Visitor Economy Strategy 2023-2030. Kettering: North Northamptonshire Council
- Ref.15 Long Distance Walkers Association (2024). Long Distance Paths: Search for a Path app. Available at [REDACTED]
- Ref.16 Sustrans (2024). The National Cycle Network. Available at [REDACTED]

Green Hill Solar Farm

EIA Scoping Report

Appendix 21: Agricultural Circumstances

Revision A

Prepared by: Arcadis

Date: July 2024

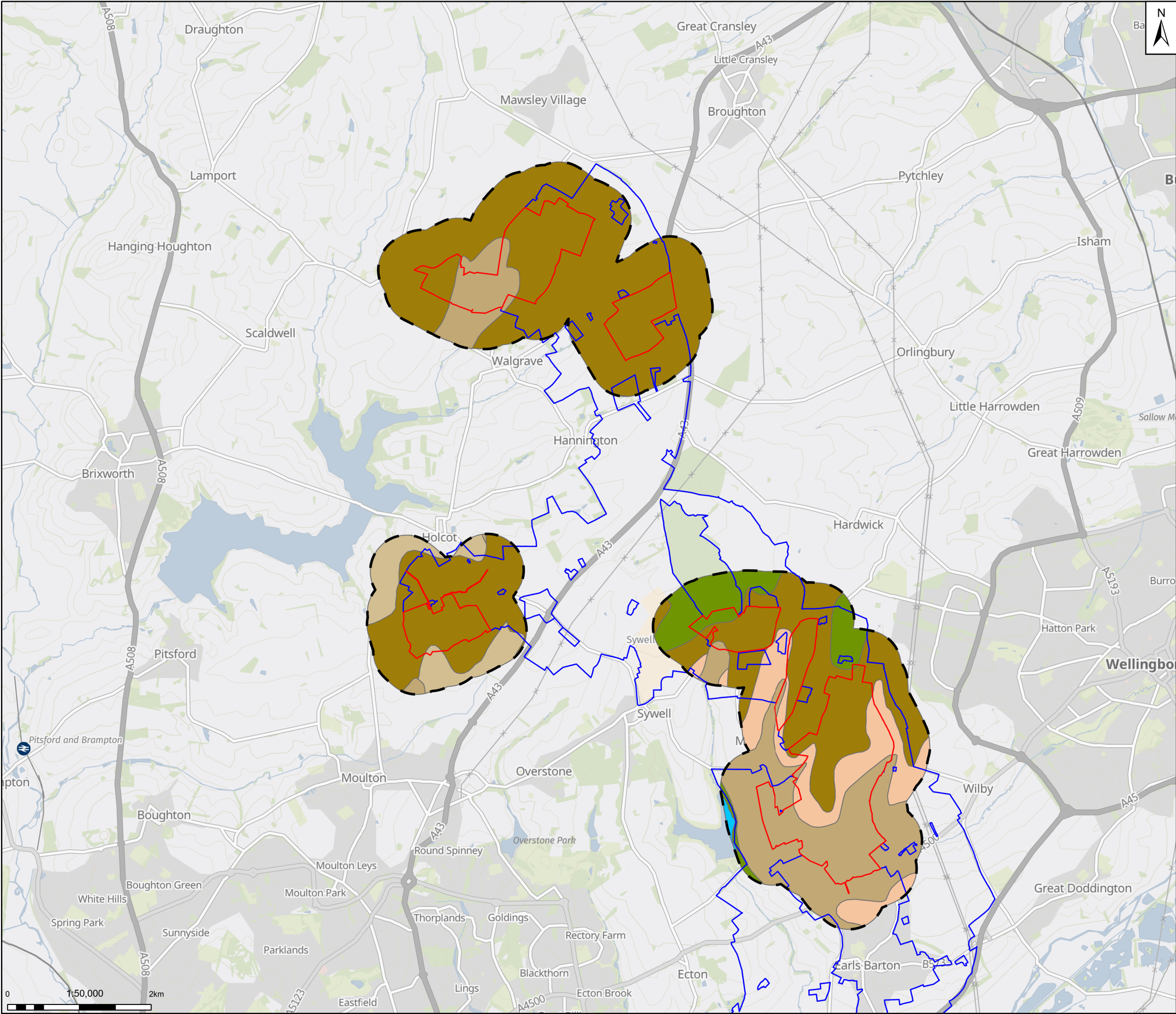
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N

Legend

Site Boundary

Study Area (500m)

Cable Search Area

National Soils Survey

BANBURY

DENCHWORTH

FLADBURY 1

HANSLOPE

LAKE

Moreton

OXPASTURE

RAGDALE

WATERSTOCK

WICK 1

WICKHAM 2

Notes

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01	27/06/24	INITIAL ISSUE	RM	JR	ZL
Rev	Date	Description	Drawn	Check	Approv

Client:

PROJECT: **GREEN HILL SOLAR**

Site

Green Hill Solar,
Northamptonshire

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Title:

National Soils Survey Map

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Drawn	R. Millman	Date	27 JUN 24	Signed
Checked	J. Ryan	Date	27 JUN 24	Signed
Approved	Z. Liu	Date	27 JUN 24	Signed
Scale:	1:50,000	Datum:	AOD	
Original Size:	A3	Grid:	OS	
Suitability Code:	S2	Project Number:	30198521	

Suitability Description:

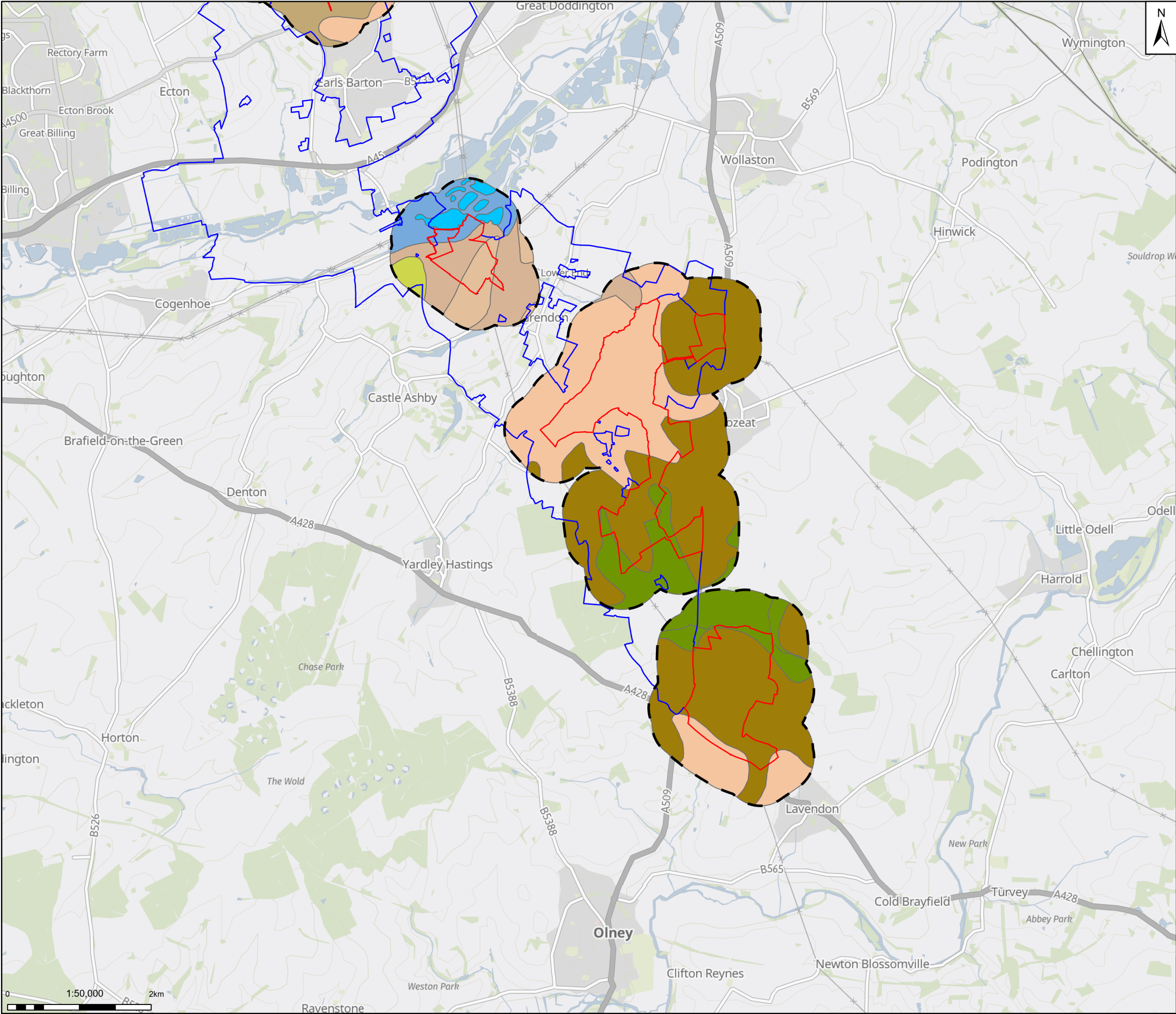
For Information

Drawing Number:

30198521-ARC-EGN-ZZ-DR-ZZ-00001-S2

Revision:

P01



Site Boundary

Study Area (500m)

Cable Search Area

National Soils Survey

BANBURY

DENCHWORTH

FLADBURY 1

HANSLOPE

LAKE

Moreton

OXPASTURE

RAGDALE

WATERSTOCK

WICK 1

WICKHAM 2

Notes

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01	27/06/24	INITIAL ISSUE	RM	JR	ZL
Rev	Date	Description	Drawn	Check	Approv

Client:

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POWER

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Site

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National Soils Survey Map

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Suitability Code:	S2	Project Number:		30198521	

Suitability Description:

For Information

Drawing Number:

30198521-ARC-EGN-ZZ-DR-ZZ-00001-S2

Revision:

P01