



SUNNICA ENERGY FARM

EN010106

Volume 6

Environmental Statement

6.2 Appendix 9D: Water Resources Data

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and
Procedure) Regulations 2009



Planning Act 2008

**The Infrastructure Planning
(Applications: Prescribed Forms and
Procedure) Regulations 2009**

Sunnica Energy Farm

**Environmental Statement
Appendix 9D: Water Resources Data**

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1 Introduction

1.1.1 This section contains the following data:

- a. **Table 1-1:** Environment Agency Abstractions
- b. **Table 1-2:** Private Water Supplies known to each Local Authority
- c. **Table 1-3:** Groundwater Chemistry: major anions and cations
- d. **Table 1-4:** Groundwater Chemistry: trace elements

1.1.2 The Environment Agency information was received after a request for abstraction data received on 30th August 2019 (EAn/2019/136538) and 10th January 2019 (EAn/2018/110020)

1.1.3 The Private Water Supplies were received from East Cambridgeshire Council on 7th August 2020, and West Suffolk on 20 January 2020.

1.1.4 The Groundwater chemistry data within **Table 1-3** and **1-4** was obtained from the Environment Agency (EA), 2004. Baseline Report Series 13: The Great Ouse Chalk aquifer, East Anglia British Geological Survey Commissioned Report No. CR/04/236N. Environment Agency Science Group: Air, Land & Water Technical Report NC/99/74/13

Table 1-1: Environment Agency Licensed Abstractions within 1000 m of the Order Limits (received in 2019)

Licence No.	Name	National Grid Reference	Use	Annual Quantity (m ³)	Source of Water	Label on Figure 9-1	Approximate Distance to Order Limits (m)
6/33/36/*S/0010	Fordham Abbey Farms	TL 6347 6904	Spray Irrigation - Direct	4546	Surface water	S55-62	0
6/33/36/*S/0020	Chippenham Park Farm	TL 6344 6894	Spray Irrigation - Direct	31822	Surface water	S66-73	0

Licence No.	Name	National Grid Reference	Use	Annual Quantity (m ³)	Source of Water	Label on Figure 9-1	Approximate Distance to Order Limits (m)
6/33/36/*S/0020	Chippenham Park Farm	TL 6394 6877	Spray Irrigation - Direct	31822	Surface water	S66-73	0
6/33/36/*S/0020	Chippenham Park Farm	TL 6389 6836	Spray Irrigation - Direct	31822	Surface water	S66-73	0
6/33/36/*S/0264	Chippenham Park Farm	TL 63451 68938	Spray Irrigation - Storage	227272	Surface water	S96-98	0
6/33/36/*S/0264	Chippenham Park Farm	TL 63451 68938	Spray Irrigation - Direct	50000	Surface water	S96-98	0
6/33/37/*G/0426/R02	S J P Mortlock Ltd	TL 68839 72711	Spray Irrigation - Direct	36000	Groundwater		0
6/33/38/*G/0062/R02	Moulton Manor Farm	TL 68670 71180	Spray Irrigation - Direct	71000	Groundwater		0
6/33/38/*G/0062/R02	Moulton Manor Farm	TL 68670 71180	Spray Irrigation - Storage	45000	Groundwater		0
6/33/38/*S/0057	G A Thornalley & Sons	TL 66377 74492	Transfer Between Sources (Post Water Act 2003)	90900	Surface water	S134-137	0
6/33/39/*S/0478/R01	T R & J R Waters	TL 66377 74492	Spray Irrigation - Direct	233491	Surface water	S173-S181	0
AN/033/0037/012/R02	Freckenham Estate	TL 67693 72809	Spray Irrigation - Direct	59100	Groundwater		0

Licence No.	Name	National Grid Reference	Use	Annual Quantity (m ³)	Source of Water	Label on Figure 9-1	Approximate Distance to Order Limits (m)
AN/033/0037/012/R02	Freckenham Estate	TL 67693 72809	Spray Irrigation - Storage	59100	Groundwater		0
AN/033/0038/003/R01	Freckenham Estate	TL 66562 72489	Spray Irrigation - Storage	54545	Surface water	S196	0
6/33/36/*S/0020	Chippenham Park Farm	TL 6380 6836	Spray Irrigation - Direct	31822	Surface water	S66-73	3
6/33/36/*S/0020	Chippenham Park Farm	TL 6363 6901	Spray Irrigation - Direct	31822	Surface water	S66-73	4
6/33/36/*S/0020	Chippenham Park Farm	TL 6354 6861	Spray Irrigation - Direct	31822	Surface water	S66-73	6
6/33/36/*S/0020	Chippenham Park Farm	TL 6395 6818	Spray Irrigation - Direct	31822	Surface water	S66-73	7
6/33/37/*G/0096	Upton Suffolk Farms	TL 697 730	Spray Irrigation - Direct	32959	Groundwater		12
6/33/37/*G/0096	Upton Suffolk Farms	TL 697 730	Spray Irrigation - Anti Frost	32959	Groundwater		12
6/33/36/*S/0020	Chippenham Park Farm	TL 6411 6815	Spray Irrigation - Direct	31822	Surface water	S66-73	28
6/33/34/*S/0068	R Brown & Sons	TL 5818 6790	Spray Irrigation - Direct	4545	Surface water	S138	36

Licence No.	Name	National Grid Reference	Use	Annual Quantity (m ³)	Source of Water	Label on Figure 9-1	Approximate Distance to Order Limits (m)
6/33/28/*G/0049/R02	Environment Agency	TL 6731 6680	Transfer Between Sources (Post Water Act 2003)	640000	Groundwater		39
6/33/38/*S/0057	G A Thornalley & Sons	TL 66172 74000	Transfer Between Sources (Post Water Act 2003)	90900	Surface water	S134-136	47
6/33/38/*S/0050/R01	Moulton Manor Farm (Holdings) Ltd	TL 68440 70537	Spray Irrigation - Storage	68000	Surface water	S133	98
6/33/34/*S/0303/R01	G K Harrington & Sons	TL 58810 68390	Spray Irrigation - Direct	13600	Surface water	S47-54	106
6/33/36/*S/0010	Fordham Abbey Farms	TL 6345 6927	Spray Irrigation - Direct	4546	Surface water	S55-62	123
6/33/37/*G/0096	Upton Suffolk Farms	TL 694 726	Spray Irrigation - Direct	32959	Groundwater		127
6/33/37/*G/0096	Upton Suffolk Farms	TL 694 726	Spray Irrigation - Anti Frost	32959	Groundwater		127
6/33/38/*G/0071/R02	R F Tilbrook & Sons	TL 68877 68090	Spray Irrigation - Direct	80200	Groundwater		137
6/33/37/*G/0109	Miss C Norman	TL 6750 7437	Spray Irrigation - Direct	1018	Groundwater		150

Licence No.	Name	National Grid Reference	Use	Annual Quantity (m ³)	Source of Water	Label on Figure 9-1	Approximate Distance to Order Limits (m)
6/33/34/*S/0280/R01	H J Hurrell	TL 5772 6715	Spray Irrigation - Direct	21100	Surface water	S11-26	153
6/33/34/*S/0068	R Brown & Sons	TL 5876 6830	Spray Irrigation - Direct	4545	Surface water	S3-5	154
6/33/37/*G/0096	Upton Suffolk Farms	TL 694 725	Spray Irrigation - Direct	32959	Groundwater		158
6/33/37/*G/0096	Upton Suffolk Farms	TL 694 725	Spray Irrigation - Anti Frost	32959	Groundwater		158
6/33/36/*S/0010	Fordham Abbey Farms	TL 6400 6921	Spray Irrigation - Direct	4546	Surface water	S55-62	169
6/33/38/*G/0021	R F Turner & Son	TL 676 690	General Farming & Domestic	659	Groundwater		200
6/33/39/*S/0478/R01	T R & J R Waters	TL 66470 75102	Spray Irrigation - Direct	233491	Surface water	S173-S181	211
6/33/39/*S/0478/R01	T R & J R Waters	TL 66470 75102	Spray Irrigation - Direct	233491	Surface water	S173-S181	211
6/33/38/*S/0057	G A Thornalley & Sons	TL 66820 75040	Spray Irrigation - Direct	81819	Surface water	S134-136	214
6/33/36/*S/0168	Fordham Abbey Farms	TL 631 693	General Farming & Domestic	2273	Surface water	S84	220

Licence No.	Name	National Grid Reference	Use	Annual Quantity (m ³)	Source of Water	Label on Figure 9-1	Approximate Distance to Order Limits (m)
6/33/37/*G/0109	Miss C Norman	TL 6754 7444	Spray Irrigation - Direct	1018	Groundwater		221
6/33/34/*S/0293/R01	Clarke Farms (Isleham) Limited	TL 66469 75113	Spray Irrigation - Direct	48830	Surface water		222
6/33/34/*S/0280/R01	H J Hurrell	TL 5781 6779	Spray Irrigation - Direct	21100	Surface water		249
6/33/37/*G/0109	Miss C Norman	TL 6758 7449	Spray Irrigation - Direct	1018	Groundwater		272
6/33/34/*S/0293/R01	Clarke Farms (Isleham) Limited	TL 60912 68787	Spray Irrigation - Direct	31790	Surface water	S34-40	276
6/33/38/*S/0068	A G Wright & Son (Farms) Ltd	TL 6806 7064	Spray Irrigation - Storage	272760	Surface water	S138	279
6/33/34/*S/0280/R01	H J Hurrell	TL 5744 6734	Spray Irrigation - Direct	21100	Surface water	S11-26	286
6/33/37/*S/0423/R01	H Summers & Son	TL 67292 74711	Spray Irrigation - Direct	15900	Surface water	S117-118	293
6/33/36/*S/0010	Fordham Abbey Farms	TL 6340 6947	Spray Irrigation - Direct	4546	Surface water	S55-62	309
6/33/36/*S/0010	Fordham Abbey Farms	TL 6323 6950	Spray Irrigation - Direct	4546	Surface water	S55-62	366

Licence No.	Name	National Grid Reference	Use	Annual Quantity (m ³)	Source of Water	Label on Figure 9-1	Approximate Distance to Order Limits (m)
6/33/34/*G/0001	Exning Estate Co	TL 619 682	General Farming & Domestic	2945	Groundwater		366
6/33/37/*S/0378	Royal Worlington & Newmarket Golf Club	TL 702 735	Spray Irrigation - Storage	18181	Surface water	S114	381
6/33/37/*G/0400/R02	Upton Suffolk Farms	TL 70260 71801	Spray Irrigation - Anti Frost	9320	Groundwater		391067
6/33/37/*G/0400/R02	Upton Suffolk Farms	TL 70260 71801	Spray Irrigation - Direct	162835	Groundwater		391
6/33/37/*G/0400/R02	Upton Suffolk Farms	TL 70260 71801	General Farming & Domestic	49640	Groundwater		391.
6/33/37/*G/0187	Upton Suffolk Farms	TL 703 718	Vegetable Washing	22730	Groundwater		393
6/33/37/*G/0101	Royal Worlington & Newmarket Golf Club	TL 699 735	Spray Irrigation - Direct	3636	Groundwater		412
6/33/37/*G/0101	Royal Worlington & Newmarket Golf Club	TL 699 735	Spray Irrigation - Storage	3636	Groundwater		412
6/33/39/*S/0478/R01	T R & J R Waters	TL 66793 75265	Spray Irrigation - Direct	233491	Surface water	S173-S181	429

Licence No.	Name	National Grid Reference	Use	Annual Quantity (m ³)	Source of Water	Label on Figure 9-1	Approximate Distance to Order Limits (m)
6/33/37/*G/0400/R02	Upton Suffolk Farms	TL 69715 71747	Spray Irrigation - Direct	162835	Groundwater		467
6/33/37/*G/0400/R02	Upton Suffolk Farms	TL 69715 71747	Make-Up or Top Up Water	37125	Groundwater		467
6/33/36/*S/0264	Chippenham Park Farm	TL 63842 67556	Spray Irrigation - Direct	37000	Surface water	S96-98	588
6/33/34/*S/0280/R01	H J HURRELL	TL 5811 6630	Spray Irrigation - Direct	21100	Surface water	S11-26	657
6/33/34/*G/0001	EXNING ESTATE CO	TL 623 680	General Farming & Domestic	414	Groundwater		703
6/33/34/*S/0280/R01	H J HURRELL	TL 5827 6617	Spray Irrigation - Direct	21100	Surface water	S11-26	809
6/33/34/*S/0280/R01	H J HURRELL	TL 5853 6624	Spray Irrigation - Direct	21100	Surface water	S11-26	841
6/33/34/*S/0280/R01	H J HURRELL	TL 5834 6615	Spray Irrigation - Direct	21100	Groundwater		847
6/33/37/*G/0013	Upton Suffolk Farms	TL 70942 71285	General Farming & Domestic	45461	Groundwater		860

Source: Environment Agency

Table 1-2: Private Water Supplies known to each Local Authority within 1000 m of the Order Limits

Local Authority Reference	Name of Supply	Easting	Northing	Supply Type	Daily Quantity Capacity (m ³)	Label on Figure 9-1	Approximate Distance to Order limits (m)
P/298/PWS/012	Lee Farm, Isleham Road IP28 8HR.	566218	273861	Single Domestic	0.8	PWS1	27
P/298/PWS/008	Lindcoly Kennels, IP28 8EW.	568225	271667	Reg 10*	0.6	PWS2	102
P/298/PWS/047	Bh 3, The Bungalow, Freckenham Road, Suffolk.	567404	274236	Single Domestic	0.2	PWS3	367
P/298/PWS/048	Bh 2, The Bungalow, Freckenham Road, Suffolk.	567404	274236	Single Domestic	0.4	PWS4	367
P/298/PWS/046	Bh 1, The Bungalow, Freckenham Road, Suffolk.	567467	274231	Single Domestic	1	PWS5	430
NA	Wild Tracks	568400	268700	Reg 9*	10	PWS6	93
NA	Snailwell House	564505	267337	Single Domestic	0	PWS7	341
NA	Saki Brewery Fordham Abbey	562968	269468	Reg 9	10	PWS8	387
NA	Badlingham Farm	567700	270800	Single Domestic	1	PWS9	491
P/298/PWS/001	Parkside, Isleham Road, Worlington, IP28 8SW.	568300	273583	Single Domestic	0.2	PWS10	520.41
P/298/PWS/009	The Grange, Grange Lane, IP28 6BG.	571192	273444	Single Domestic	0.6	PWS11	569.18
NA	Chestnut Tree Farm	558953	269798	Single Domestic	0	PWS12	910.60

Source: West Suffolk Council (January 2020) and East Cambridgeshire Council (August 2020)

**Reg 9 - Regulation 9 Water Supply private water supply that supplies more than 10m³ per day (more than 50 people) or where the water is used as part of a commercial activity, food business or public building*
**Reg 10 - Regulation 10 Water Supply where the supply is <10m³ /day, where the water is NOT used as part of a commercial or public activity, serves a single dwelling. A local authority may monitor the supply as part of this regulation and must do so if requested to do so by the owner or occupier*

Table 1-3 Groundwater chemistry: major anions and cations

Parameter	Units	Min.	Max.	Median	Mean	97.7 th percentile ¹
Temperature	°C	10.5	13.1	11.5	11.6	13.1
pH	pH Units	6.6	8.1	7.1	7.2	7.7
Redox potential (Eh)	mV	227	449	423	402	449
Dissolved Oxygen	mg/l	0.32	10.0	6.2	5.5	9.8
Specific Electrical Conductivity (SEC)	µS/cm	469	1112	688	723	1082
Stable isotope 2H (δ ² H)	0/00	-54.9	-45.8	-51.0	-50.9	-46.8
Stable isotope 18O (δ ¹⁸ O)	0/00	-8	-7.1	-7.6	-7.5	-7.2
Stable isotope 13C (δ ¹³ C)	0/00	-15.4	-12.2	-14.1	-14.0	-12.3
Calcium (Ca)	mg/l	81	188	128	130	183
Magnesium (Mg)	mg/l	1.1	15	3.3	3.9	11
Sodium (Na)	mg/l	7.0	65	14	17	43
Potassium (K)	mg/l	0.41	15	2.7	3.2	8.3
Chlorine (Cl)	mg/l	9.0	126	30	36	88

Parameter	Units	Min.	Max.	Median	Mean	97.7 th percentile ¹
Sulphae (SO ₄)	mg/l	10	120	34	41	108
Bicarbonate (HCO ₃)	mg/l	190	398	277	283	371
Nitrate (NO ₃ as N)	mg/l	0.287	38.4	9.5	10.3	25.0
Nitrite (NO ₂ as N)	mg/l	<0.001	0.101	0.006	0.019	0.093
Ammonium (NH ₄ as N)	mg/l	<0.003	0.17	<0.003	0.011	0.088
Phosphorous (P)	mg/l	<0.1	0.20	<0.1	<0.1	<0.1
Total Organic Carbon (TOC)	mg/l	0.4	5.6	1.3	1.6	4.9
Dissolved Organic Carbon (DOC)	mg/l	0.2	4.1	1.5	1.7	3.5
Flourine (F)	mg/l	0.10	0.58	0.17	0.20	0.53
Bromine (Br)	mg/l	<0.03	0.210	0.080	0.086	0.160
Iodine (I)	mg/l	0.002	0.034	0.005	0.006	0.012
Silica (Si)	mg/l	4.5	13.3	7.4	8.0	13.0

Source: Baseline Report Series 13: The Great Ouse Chalk aquifer, East Anglia British Geological Survey Commissioned Report No. CR/04/236N

¹ 97.7 percentile given in study as basis upon which to define and remove outliers, values greater than the value at this percentile are considered outliers and removed from dataset

Table 1-4 Groundwater chemistry: trace elements

Parameter	Units	Min.	Max.	Median	Mean	97.7 th percentile
Silver (Ag)	µg/l	<0.05	0.06	<0.05	<0.05	<0.05
Aluminium (Al)	µg/l	<1.0	7.0	1.0	1.4	5.0
Arsenic (As)	µg/l	<0.015	6.0	5.0	4.3	6.0
Gold (Au)	µg/l	<0.05	0.23	<0.05	<0.05	0.16
Boron (B)	µg/l	<20	75	23	22	63
Barium (Ba)	µg/l	21	121	61	63	106
Beryllium (Be)	µg/l	<0.05	0.06	<0.05	<0.05	0.060
Bismuth (Bi)	µg/l	<0.05	0.09	<0.05	<0.05	0.090
Cadmium (Cd)	µg/l	<0.05	0.12	<0.05	<0.05	0.071
Cerium (Ce)	µg/l	<0.01	0.01	<0.01	<0.01	<0.01
cobolt (Co)	µg/l	<0.02	2.85	<0.02	0.15	1.13
chromium (Cr)	µg/l	<0.5	5.00	<0.5	<0.5	1.26
Caesium (Cs)	µg/l	<0.01	0.05	<0.01	0.01	0.03
Copper (Cu)	µg/l	<0.1	99	3.2	7.5	52
Dysprosium (Dy)	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01
Erbium (Er)	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01

Parameter	Units	Min.	Max.	Median	Mean	97.7 th percentile
Europium (Eu)	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01
Iron (Fe)	mg/l	<0.005	2.1	<0.005	0.83	0.77
Gallium (Ga)	µg/l	<0.05	<0.05	<0.05	<0.05	<0.05
Gadolinium (Gd)	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01
Germanium (Ge)	µg/l	<0.05	0.15	<0.05	<0.05	0.14
Hafnium (Hf)	µg/l	<0.02	<0.02	<0.02	<0.02	<0.02
Mercury (Hg)	µg/l	<0.1	0.10	<0.1	<0.1	0.10
Holmium (Ho)	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01
Indium (In)	µg/l	<0.01	0.01	<0.01	<0.01	0.01
Iridium (Ir)	µg/l	<0.05	<0.05	<0.05	<0.05	<0.05
Lanthanum (La)	µg/l	<0.01	0.01	<0.01	<0.01	<0.01
Lithium (Li)	µg/l	<0.025	17	7.0	7.2	16
Lutetium (Lu)	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese (Mn)	µg/l	<0.05	102	0.16	3.4	49
Molybdenum (Mo)	µg/l	<0.1	1.8	0.30	0.42	1.7
Niobium (Nb)	µg/l	<0.01	0.03	<0.01	<0.01	0.01
Neodymium (Nd)	µg/l	<0.01	0.01	<0.01	<0.01	<0.01

Parameter	Units	Min.	Max.	Median	Mean	97.7 th percentile
Nickel (Ni)	µg/l	<0.2	13.9	<0.2	1.47	12.3
Osmium (Os)	µg/l	<0.05	<0.05	<0.05	<0.05	<0.05
Lead (Pb)	µg/l	<0.1	14.8	0.60	1.31	10.3
Palladium (Pd)	µg/l	<0.2	<0.2	<0.2	<0.2	<0.2
Praseodymium (Pr)	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01
Platinum (Pt)	µg/l	<0.01	0.01	<0.01	<0.01	<0.01
Rubidium (Rb)	µg/l	0.19	4.72	1.78	2.01	4.20
Rhenium (Re)	µg/l	<0.01	0.030	0.010	0.011	0.030
Rhodium (Rh)	µg/l	<0.01	0.030	0.010	0.015	0.030
Ruthenium (Ru)	µg/l	<0.05	<0.05	<0.05	<0.05	<0.05
Antimony (Sb)	µg/l	<0.05	0.57	0.12	0.13	0.36
Scandium (Sc)	µg/l	0.99	6.7	3.6	3.8	6.3
Selenium (Se)	µg/l	<0.015	7.1	1.1	1.3	3.2
Samarium (Sm)	µg/l	<0.05	<0.05	<0.05	<0.05	<0.05
Tin (Sn)	µg/l	0.20	0.51	0.37	0.36	0.43
Strontium (Sr)	µg/l	193	974	465	467	933
Tantalum (Ta)	µg/l	<0.05	<0.05	<0.05	<0.05	<0.05

Parameter	Units	Min.	Max.	Median	Mean	97.7 th percentile
Terbium (Tb)	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01
Tellurium (Te)	µg/l	<0.05	<0.05	<0.05	<0.05	<0.05
Thorium (Th)	µg/l	<0.05	0.13	<0.05	<0.05	0.061
Titanium (Ti)	µg/l	<10	<10	<10	<10	<10
Thallium (Tl)	µg/l	<0.01	0.070	<0.01	0.014	0.060
Thulium (Tm)	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium (U)	µg/l	0.23	7.6	0.46	0.68	3.0
Vanadium (V)	µg/l	<1.0	<1.0	<1.0	<1.0	<1.0
Tungsten (W)	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Ytterbium (Yb)	µg/l	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc (Zn)	µg/l	<0.05	6080	11	105	196
Zirconium (Zr)	µg/l	<0.5	<0.5	<0.5	<0.5	<0.5

Source: Baseline Report Series 13: The Great Ouse Chalk aquifer, East Anglia British Geological Survey Commissioned Report No. CR/04/236N

¹ 97.7 percentile given in study as basis upon which to define and remove outliers, values greater than the value at this percentile are considered outliers and removed from dataset