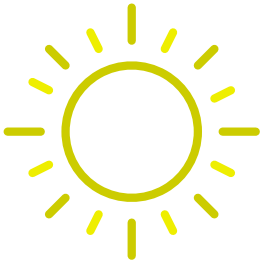
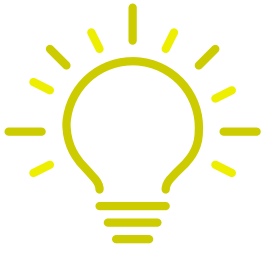
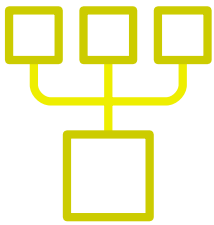
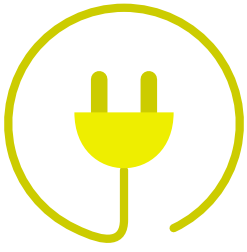
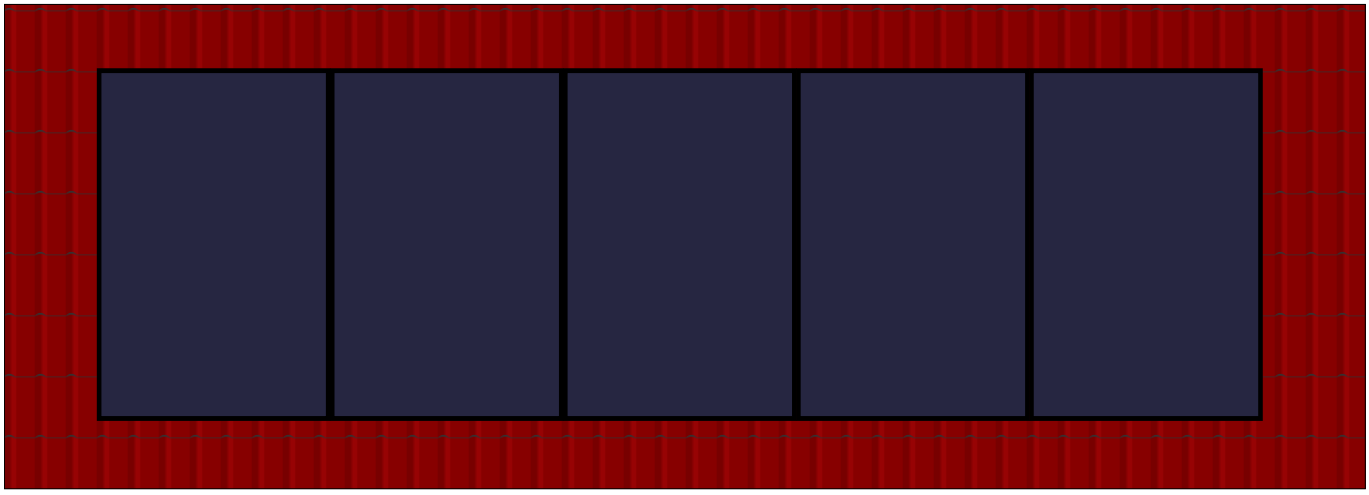
APEX
Renewable Energy Surveys

Project Name: Ingleby LS29 0NB
Address: 1 Kitty Fold, LS29 0NB
Date Created: 2nd August 2023
Designer: Apex Surveys System Design Team

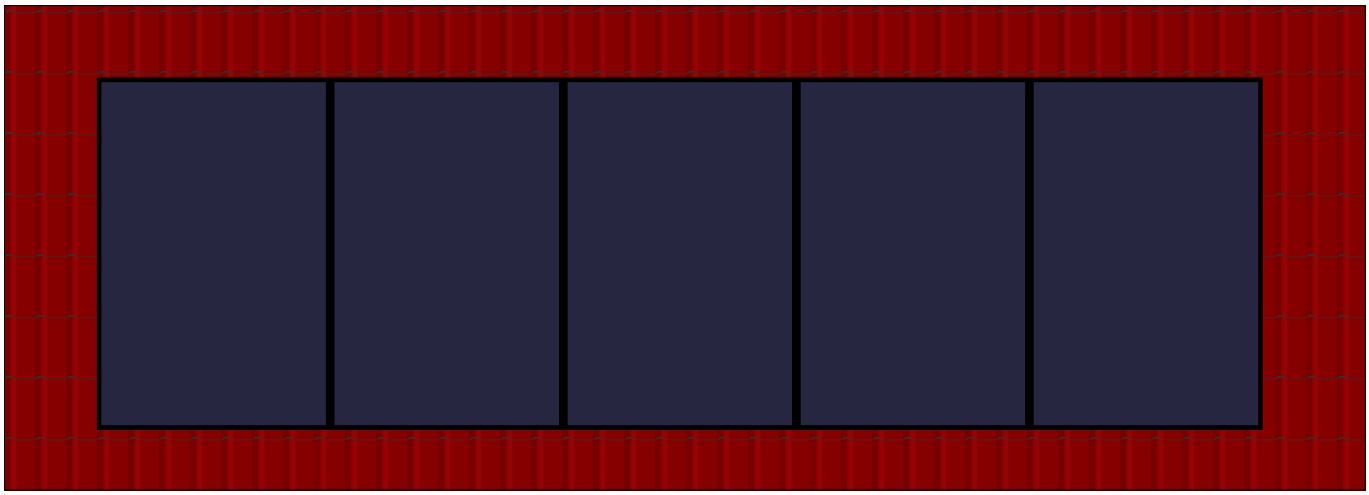





Roof Layout

Roof West



Roof East



Component list

Item	Quantity
Dmegc Black - 405W solar panel	10
Growatt SPH BL-UP 3kW Dual MPPT Hybrid Inverter inverter	1
NET Emlite Bi-directional Meter ECA2.nv	1
Label sheet	1
AC isolator - Projoy 20A 4-pole	2
IMO DC isolator 16A 2p 1string	2
Pair of MC4 connectors	4
50m reel of 4mm2 solar cable	1
Fastensol end clamp (30mm black)	8
Fastensol mid clamp (30mm black)	16
Fastensol black end cap	8
Fastensol portrait concrete tile roof hook	24
Fastensol rail splice	4
Fastensol silver rail 3300mm	8

Inverter checks

Growatt SPH BL-UP 3kW Dual MPPT Hybrid Inverter

Panels			
PV power	**4050**	Rated AC output	**3000**

Input 1: 5 Dmegc Black - 405W solar panels in 1 strings

Panels		Inverter	
PV power	**2025 W**		
Open circuit voltage at -10° C	**203 V**	Max DC voltage	**550 V**
V_{mpp} at 40° C	**147 V**	V_{mpp} lower limit	**120 V**
V_{mpp} at -10° C	**166 V**	V_{mpp} upper limit	**550 V**
I_{mpp} at 40° C	**13 A**	Max DC input current	**13.5 A**

Max voltage

The open circuit voltage of the solar panels never exceeds the voltage limit of the inverter.

✓

Max power point range

The maximum power point voltage of the solar panels is always above the lower limit of the inverter MPPT tracker. The maximum power point voltage of the solar panels is always below the upper limit of the inverter MPPT tracker.

✓

Max Current

The maximum power point current of the solar panels is always below the maximum current for the inverter MPPT tracker.

Input 2: 5 Dmegc Black - 405W solar panels in 1 strings

Panels		**Inverter**	
PV power	**2025 W**		
Open circuit voltage at -10° C	**203 V**	Max DC voltage	**550 V**
V_{mpp} at 40° C	**147 V**	V_{mpp} lower limit	**120 V**
V_{mpp} at -10° C	**166 V**	V_{mpp} upper limit	**550 V**
I_{mpp} at 40° C	**13 A**	Max DC input current	**13.5 A**

Max voltage

The open circuit voltage of the solar panels never exceeds the voltage limit of the inverter.

Max power point range

The maximum power point voltage of the solar panels is always above the lower limit of the inverter MPPT tracker. The maximum power point voltage of the solar panels is always below the upper limit of the inverter MPPT tracker.

Max Current

The maximum power point current of the solar panels is always below the maximum current for the inverter MPPT tracker.

Electrical

Growatt SPH BL-UP 3kW Dual MPPT Hybrid Inverter

AC Isolator

A AC isolator - Projoy 20A 4-pole has been specified for this input

Current

The rated isolator current (20A) is greater than the rated inverter current (13.5A)

Phases

The isolator is suitable for use on a single phase inverter.

Input 1

DC Isolator

A IMO DC isolator 16A 2p 1string has been specified for this input

Current

The isolator is rated for a current of 16A, which is more than the expected maximum current of 14A.

Voltage

At 16A the isolator is rated for a voltage of 600V, which is more than the expected maximum voltage of 203V.

Cable

10m of 4mm2 solar cable has been specified

Voltage drop

Voltage drop at maximum power point at 40°C will be around **1.10 V (0.75 percent)**

Input 2

DC Isolator

A IMO DC isolator 16A 2p 1string has been specified for this input

Current

The isolator is rated for a current of 16A, which is more than the expected maximum current of 14A.

Voltage

At 16A the isolator is rated for a voltage of 600V, which is more than the expected maximum voltage of 203V.

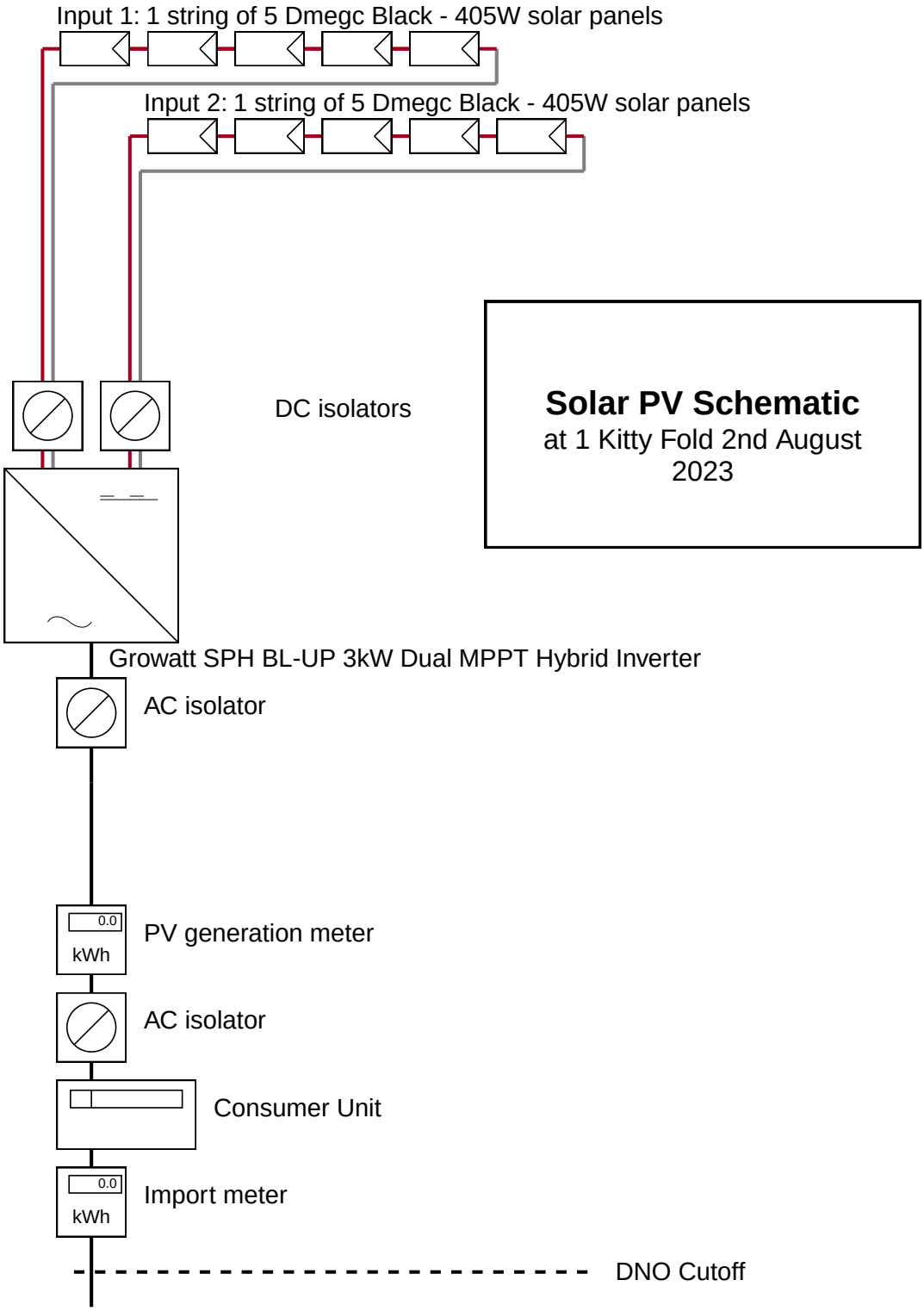
Cable

10m of 4mm2 solar cable has been specified

Voltage drop

Voltage drop at maximum power point at 40°C will be around **1.10 V (0.75 percent)**

Schematic diagram



Performance Estimate

Site details

Client

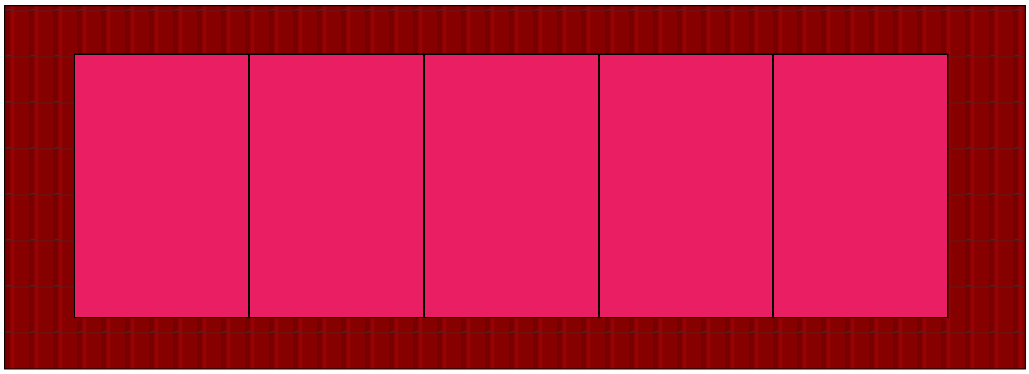
Address 1 Kitty Fold

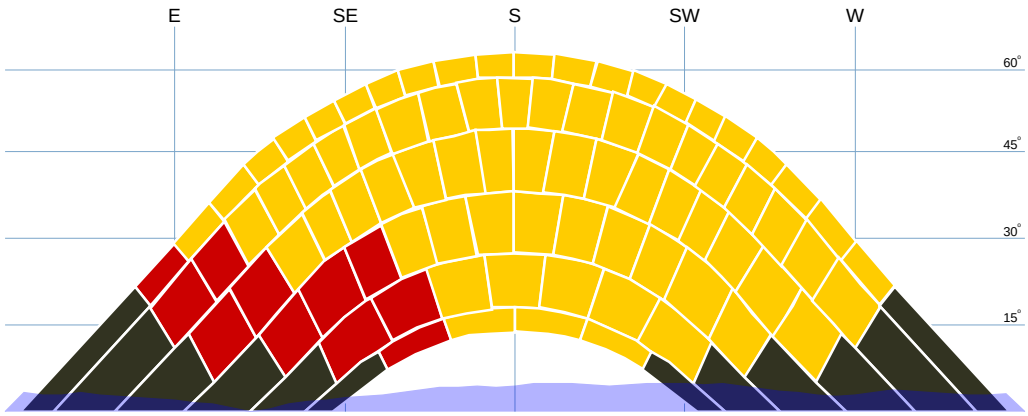
The sunpath diagram shows the arcs of the sky that the sun passes through at different times of the day and year as yellow blocks. The shaded area indicates the horizon as seen from the location of the solar array. Where objects on the horizon are within 10m of the array, an added semi-circle is drawn to represent the increased shading. Blocks of the sky that are shaded by objects on the horizon are coloured red, and a shading factor is calculated from the number of red blocks. The performance of the solar array is calculated by multiplying the size of the array (kWp) by the shading factor (sf) and a site correction factor (kk), taken from tables which take account of the geographical location, orientation and inclination of the array.

Inverter 1

Growatt SPH BL-UP 3kW Dual MPPT Hybrid Inverter

Input 1

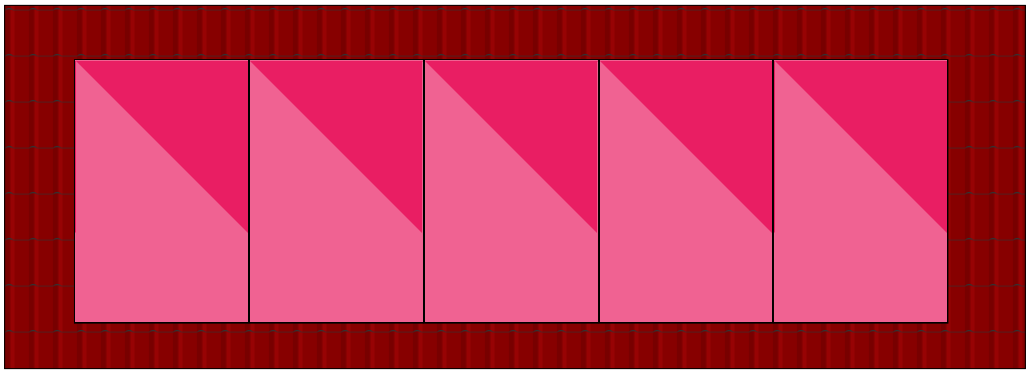


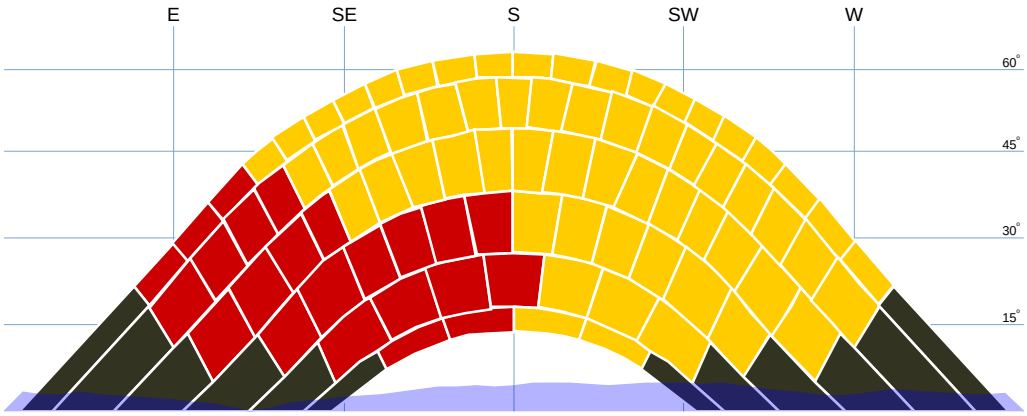


A. Installation data		
Installed capacity of PV system - kWp (stc)	**2.025**	kWp
Orientation of the PV system - degrees from South	**91**	°
Inclination of system - degrees from horizontal	**27**	°
Postcode region	**11**	

B. Performance calculations		
kWh/kWp (Kk)	**726**	kWh/kWp
Shade factor (SF)	**0.89**	
Estimated output (kWp x Kk x SF)	**1308**	kWh

Input 2





A. Installation data		
Installed capacity of PV system - kWp (stc)	**2.025**	kWp
Orientation of the PV system - degrees from South	**-89**	°
Inclination of system - degrees from horizontal	**27**	°
Postcode region	**11**	

B. Performance calculations		
kWh/kWp (Kk)	**726**	kWh/kWp
Shade factor (SF)	**0.77**	
Estimated output (kWp x Kk x SF)	**1132**	kWh

Performance Summary

A. Installation data		
Installed capacity of PV system - kWp (stc)	**4.05**	kWp
Orientation of the PV system - degrees from South	**See individual inputs**	
Inclination of system - degrees from horizontal	**See individual inputs**	
Postcode region	**11**	
B. Performance calculations		
kWh/kWp (Kk)	**See individual inputs**	
Shade factor (SF)	**See individual inputs**	
Estimated output (kWp x Kk x SF)	**2440**	kWh

Important Note: The performance of solar PV systems is impossible to predict with certainty due to the variability in the amount of solar radiation (sunlight) from location to location and from year to year. This estimate is based upon the standard MCS procedure is given as guidence only for the first year of generation. It should not be considered as a guarantee of performance.

Shading will be present on your system that will reduce its output to the factor stated. This factor was calculated using the MCS shading methodology and we believe that this will yield results within 10% of the actual energy estimate stated for most systems.