Paradise Power Systems Ltd

Project Name: 9th June 2020

Client: Olivia Callan

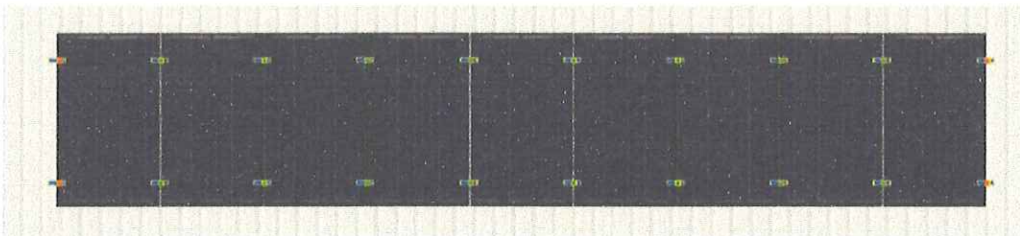
Address: Newton Road Isles of Scilly Isles of Scilly, TR23 0PR

Date Created: 9th June 2020

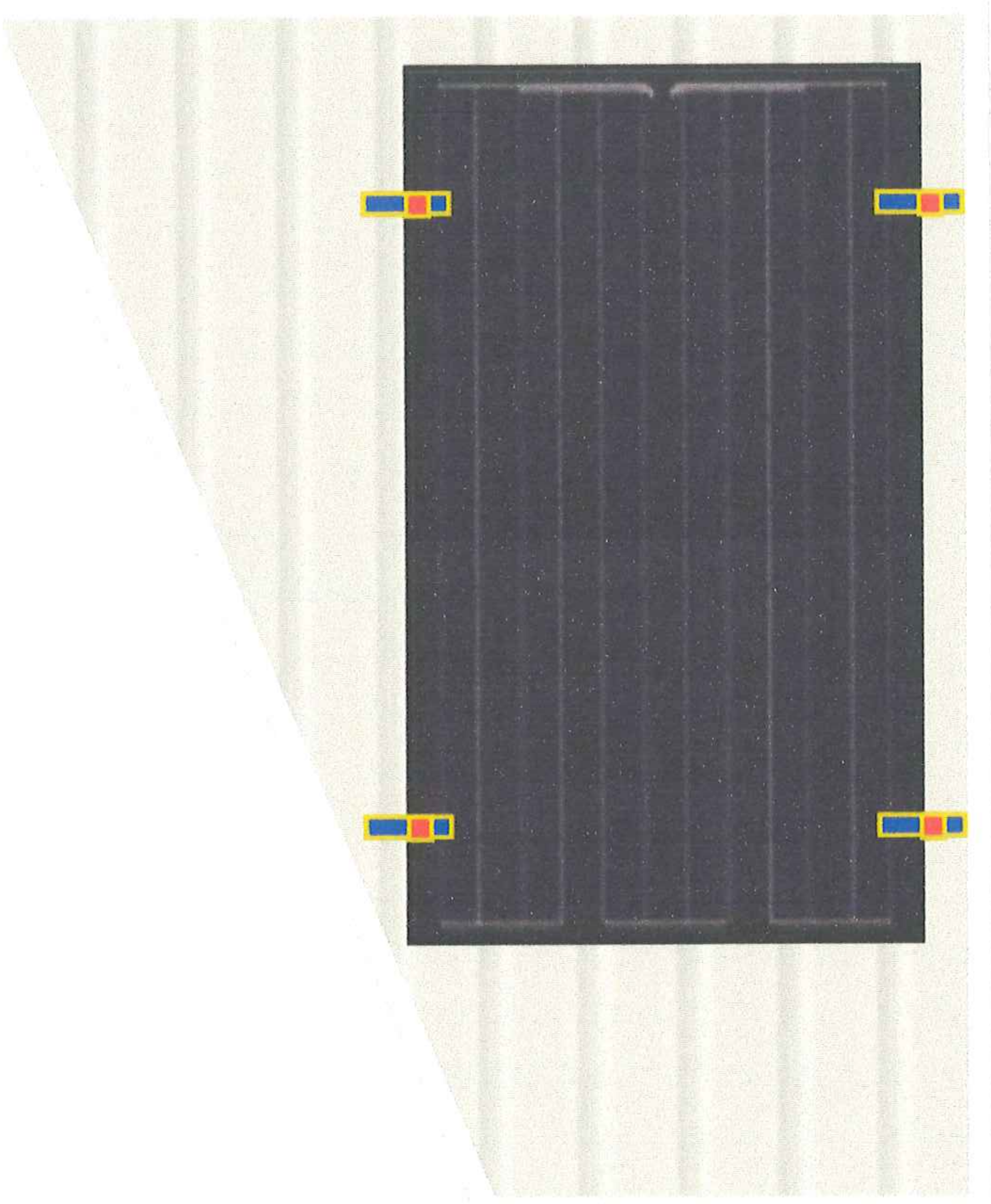
Designer: Jason Hicks Jason Hicks

Roof Layout

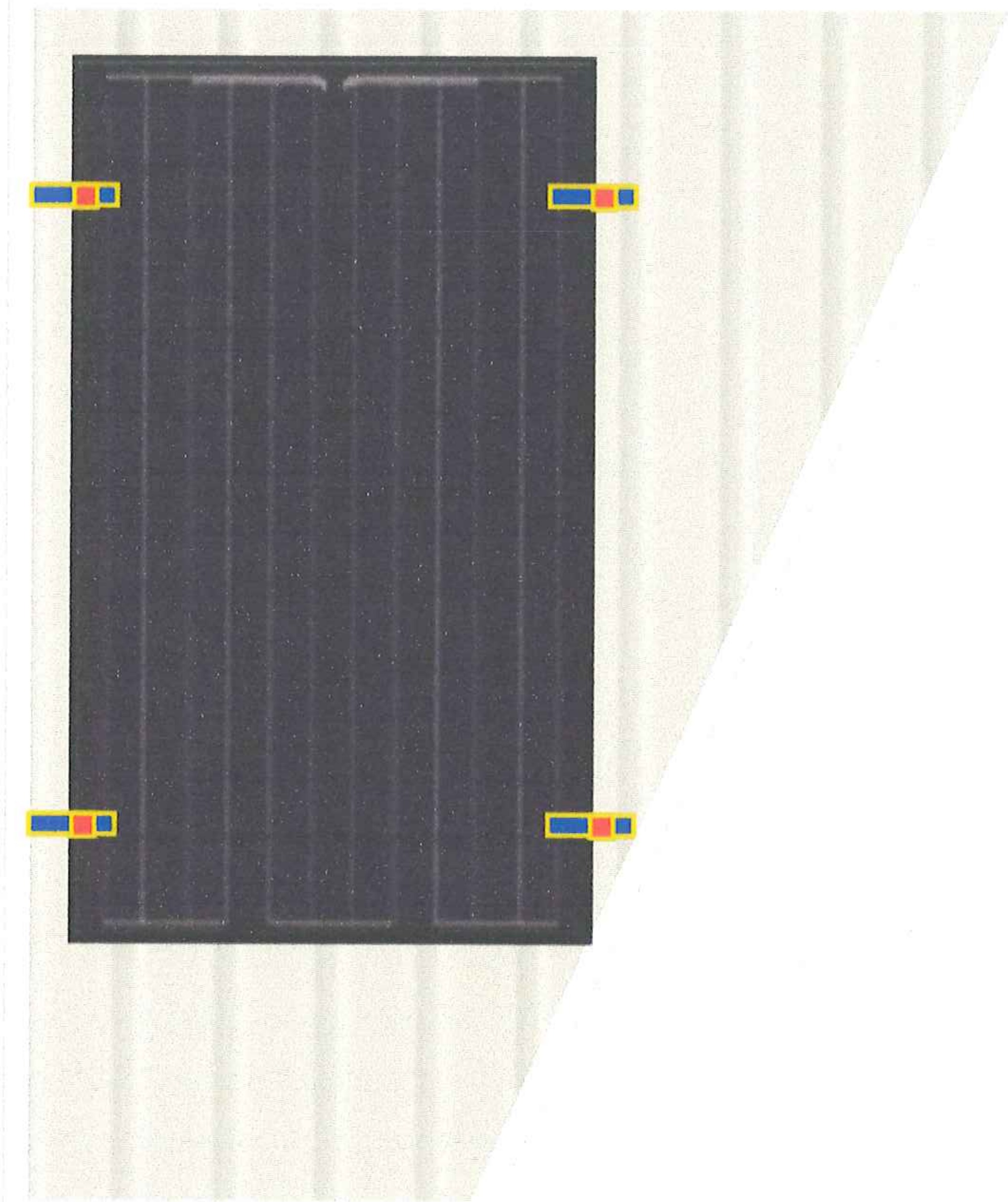
Roof 1



Roof 2



Roof 3



Component list

Item	Quantity
Q Cells 340W All Black Split Cell Mono solar panel	11
SolarEdge 3680 HD Wave - Screenless SETAPP inverter	1
Emlite ECA2 Single Phase Meter	1
Label sheet	1
Rail bolt for fastensol rails	10
SolarEdge Wattnode Modbus Meter with 100A CT Clamp	1
SolarEdge Wifi Antenna for SETAPP inverters	1
AC isolator - KN Newbury 20A 4-pole	2
SolarEdge Optimiser P370	11
Pair of MC4 connectors	2
50m reel of 4mm2 solar cable	1
Metasole flat channel (portrait)	28
Renusol end clamp (black)	12
Renusol mid clamp (black)	16

Inverter Compatibility

SolarEdge 3680 HD Wave - Screenless SETAPP

Panels		**Inverter**	
PV power:	**3740 W**	Rated AC output	**3680 W**

✓ The inverter rated output is 2 percent less than the maximum power of the array. However, a small amount of underdimensioning is normal, and there will be little loss of power.

String 1: 11 Q Cells 340W All Black Split Cell Mono solar panels with P370 optimiser

Panels		**Optimiser**	
PV power:	**340 W**	Rated input power	**370 W**
Open circuit voltage at -10° C	**46 V**	Max DC voltage	**60 V**
V_{mpp} at 40° C:	**32 V**	V_{mpp} lower limit	**8.00 V**
V_{mpp} at -10° C:	**38 V**	V_{mpp} upper limit	**60 V**
I_{mpp} at 25° C:	**10.07 A**	Max DC input current	**11 A**

String			
Total string power	**3740 W**	Max string power	**5250 W**
String length	**11**	Permitted string lengths	**8/25**

✓ The maximum expected current from the panel is **10.58A**, which is suitable for this optimiser

✓ The maximum expected power output of the panel is **340W**, which is suitable for this optimiser

✓ The maximum open circuit voltage of the panel is **46V**, which is suitable for this optimiser

✓ The maximum power point voltage of the panel is **33.94V**, which is within the correct range for this optimiser

✓ The string power output is less than the maximum input for this inverter.

✓ This string contains 11 optimisers.

Electrical

SolarEdge 3680 HD Wave - Screenless SETAPP

AC isolator

A AC isolator - KN Newbury 20A 4-pole has been specified for this inverter

✓ The rated isolator current (20A) is greater than the rated inverter current (16A)

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

Input 1

DC isolator

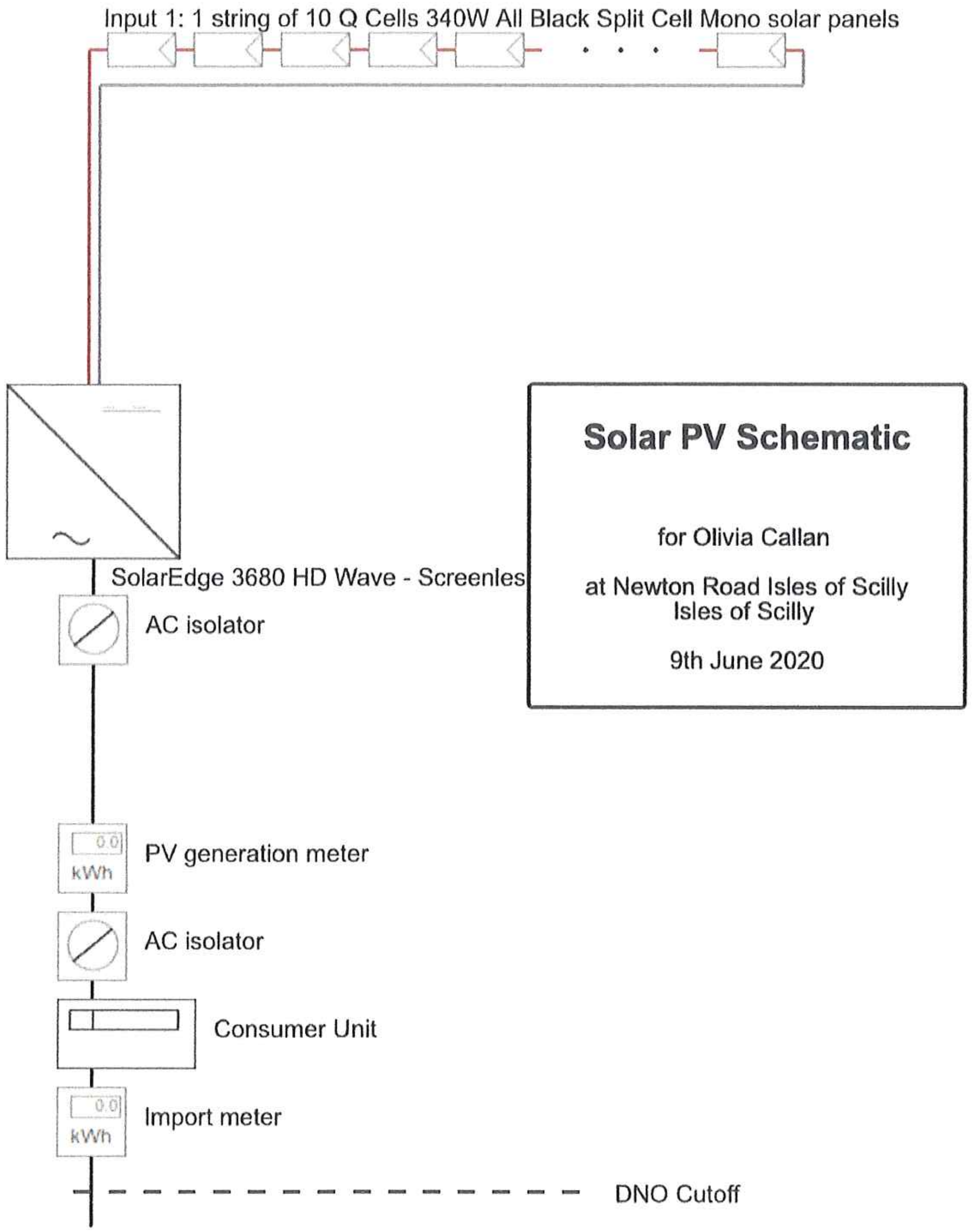
✓ This inverter contains an integrated DC Isolator.

Cable

10m of 4mm2 solar cable has been specified

✓ Voltage drop at maximum power point at 40°C will be around **0.85 V (0.22 percent)**

Schematic diagram



Annual Output Performance Estimate

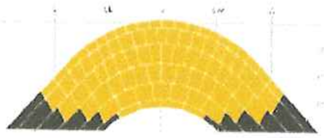
Site Details	
Client	Olivia Callan
Address	Newton Road Isles of Scilly Isles of Scilly TR23 0PR
Postcode zone	Zone 4

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: SolarEdge 3680 HD Wave - Screenless SETAPP

String 1 - shading group 1



A: Installation data	
Installed capacity	3.740 kWp
Orientation	-90°
Inclination	20°
B: Calculations	
kWh/kWp (kk)	891
Shade factor (sf)	1.00
Estimated output	3332 kWh

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 and is given as guidance only. It should not be considered a guarantee of performance.

The shade assessment has been undertaken using the standard MCS procedure. It is estimated that this method will yield results within 10% of the actual annual energy yield for most systems.

Structural calculations

Roof 1

Weight loading calculation

The total weight of the solar panels and mounting components is **215.76 kg**. Assuming this is spread evenly over the area that the solar panels cover (**17.92 m^2**), the loading imposed by the solar PV array is **12 kg/m^2**, or **0.12** kN/m^2.

The existing dead load on the roof from the roof covering is **35 kg /m^2**, or **0.34 kN/m^2**.

If we factor in an imposed load of ${results.imposedLoad} kN/m^2, then the percentage increase in loading due to the installation of the solar array becomes

100 x ((0.12 + 0.34 + 0.75) / (0.34 + 0.75) - 1) = **11%**

For a traditional cut roof with rafters and purlins we recommend also using our rafter calculator to check the load-bearing capacity of the rafters. Even if the increase in loading is more than 15% the rafters may well be able to take the additional weight.

An increase of less than 15% in the load imposed on a roof is not considered to be a significant change (The Building Regulations 2000, Approved Document A).

Please note that this method does not calculate the strength of the roof, and if a roof was badly constructed, does not meet existing building regulations, or is in poor condition then it may still not be appropriate to install an array.

Roof 2

Weight loading calculation

The total weight of the solar panels and mounting components is **20.14 kg**. Assuming this is spread evenly over the area that the solar panels cover (**1.79 m^2**), the loading imposed by the solar PV array is **11.2 kg/m^2**, or **0.11** kN/m^2.

The existing dead load on the roof from the roof covering is **12 kg /m^2**, or **0.12 kN/m^2**.

If we factor in an imposed load of ${results.imposedLoad} kN/m^2, then the percentage increase in loading due to the installation of the solar array becomes

100 x ((0.11 + 0.12 + 0.75) / (0.12 + 0.75) - 1) = **12.6%**

For a traditional cut roof with rafters and purlins we recommend also using our rafter calculator to check the load-bearing capacity of the rafters. Even if the increase in loading is more than 15% the rafters may well be able to take the additional weight.

✓ An increase of less than 15% in the load imposed on a roof is not considered to be a significant change (The Building Regulations 2000, Approved Document A).

Please note that this method does not calculate the strength of the roof, and if a roof was badly constructed, does not meet existing building regulations, or is in poor condition then it may still not be appropriate to install an array.

Roof 3

Weight loading calculation

The total weight of the solar panels and mounting components is **20.14 kg**. Assuming this is spread evenly over the area that the solar panels cover (**1.79** m^2), the loading imposed by the solar PV array is **11.2** kg/m^2, or **0.11** kN/m^2.

The existing dead load on the roof from the roof covering is **12** kg/m^2, or **0.12** kN/m^2.

If we factor in an imposed load of ${results.imposedLoad} kN/m^2, then the percentage increase in loading due to the installation of the solar array becomes

100 x ((0.11 + 0.12 + 0.75) / (0.12 + 0.75) - 1) = **12.6%**

You should note that this method does not actually check the load capacity of the roof - it merely checks that you are not increasing the loading significantly. Calculating roof strength of trussed rafter roofs is a complicated task, and if you are unsure of the strength of the roof then it would be wise to take the advice of a structural engineer.

✓ An increase of less than 15% in the load imposed on a roof is not considered to be a significant change (The Building Regulations 2000, Approved Document A).

Please note that this method does not calculate the strength of the roof, and if a roof was badly constructed, does not meet existing building regulations, or is in poor condition then it may still not be appropriate to install an array.