Rangepay Ltd
70 Churchway

Discharge of Condition 7
Solar PV

Planning Permission 2016/3174/P

Condition 7:

Solar PV: Prior to first occupation of the hotel and residential building, detailed plans showing the location and extent of photovoltaic cells to be installed on the building shall have been submitted to and approved by the Local Planning Authority in writing. The measures shall include the installation of a meter to monitor the energy output from the approved renewable energy systems. The cells shall be installed in full accordance with the details approved by the Local Planning Authority and permanently retained and maintained thereafter.

Reason: To ensure the development provides adequate on-site renewable energy facilities in accordance with the requirements of policies CC1 and CC2 of the Camden Local Plan 2017.

The scheme is for the erection of 3-storey building plus basement with rear garden and roof terrace at 1st floor level, comprising 3 x Residential units (1x2 bed & 2x1bed unit) (C3 Use Class).

Solar PV Proposals

The proposed PV panels are Canadian Solar 410W High Power Mono PERC HiKU6 Black Frame with MC4-EVO2
The CS6R-410MS 410W Mono with Black frame, is part of the HiKu6 Black series which is ideal for both residential or commercial rooftop applications.
With better shading tolerance and lower hot spot temperature. It also comes with a 12 year product warranty and 25 years linear power output warranty.

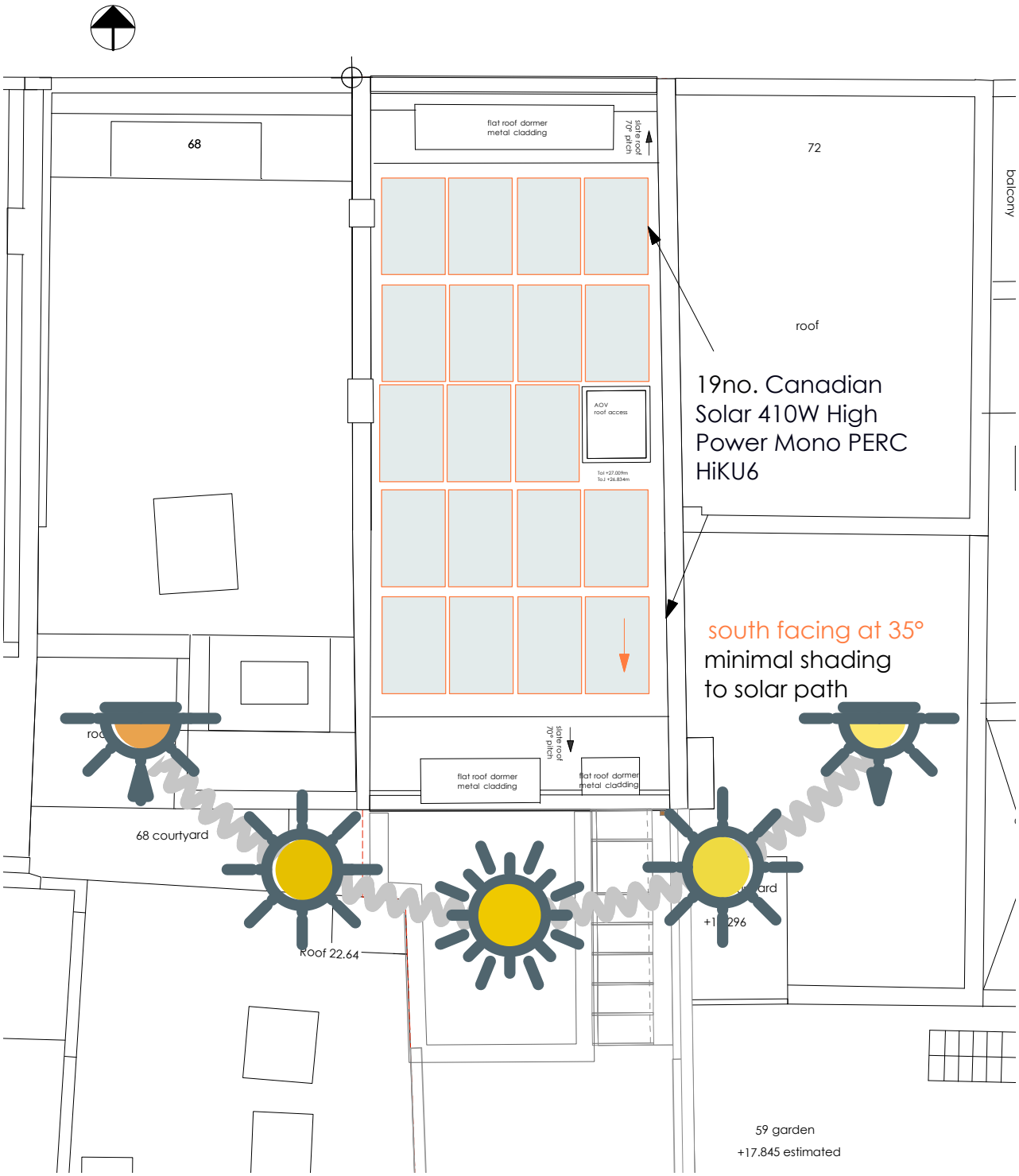
Key Features:

- Module conversion efficiency 21%
- Aesthetic Appearance
- Better shading tolerance
- Better shading tolerance
- 12-year product warranty for commercial Installations
- 25-year linear performance warranty

The technical information on the PV is attached in Appendix A.

It is proposed there will be 19 panels with overall wattage are 410W for each panel.

The system will be controlled via a Growatt PV Inverter product PV02.0113902(GD).
Appendix B has the technical information along with the test report for the installation



Roof Plan showing Solar PV to flat roof

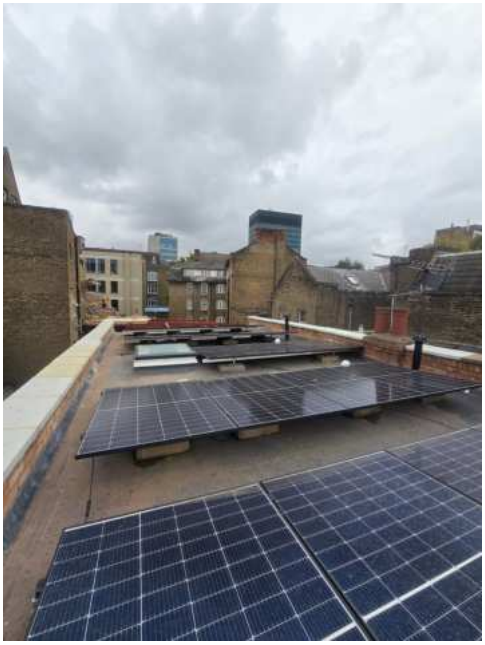
Conclusion

The Solar PV proposals will generate **4,900 kWh** of low carbon electricity.
This system has an estimated carbon savings: **1,110 kg CO_2 per year**

The Energy Saving Trusts calculations are attached in Appendix C

The photos show the low profile and minimal impact on the neighbouring properties

View looking north



view looking south

Appendix A:

Solar Panel Technical Information

NEW

CanadianSolar

HiKu6 Mono PERC

395 W ~ 420 W

CS6R-395|400|405|410|415|420MS

MORE POWER

- 420 W — Module power up to 420 W
  Module efficiency up to 21.5%
- Lower LCOE & system cost
- Comprehensive LID / LeTID mitigation technology, up to 50% lower degradation
- Better shading tolerance

MORE RELIABLE

- Minimizes micro-crack impacts
- Heavy snow load up to 5400 Pa, wind load up to 2400 Pa*

25 Years **Industry Leading Product Warranty on Materials and Workmanship***

25 Years **Linear Power Performance Warranty***

1st year power degradation no more than 2%
Subsequent annual power degradation no more than 0.55%

*Subject to the terms and conditions contained in the applicable Canadian Solar Limited Warranty Statement. Also this 25-year limited product warranty is available only for products installed and operating on residential rooftops in certain regions.

MANAGEMENT SYSTEM CERTIFICATES*

ISO 9001:2015 / Quality management system
ISO 14001:2015 / Standards for environmental management system
ISO 45001: 2018 / International standards for occupational health & safety

PRODUCT CERTIFICATES*

IEC 61215 / IEC 61730 / CE / INMETRO
UL 61730 / IEC 61701 / IEC 62716
Take-e-way

* The specific certificates applicable to different module types and markets will vary, and therefore not all of the certifications listed herein will simultaneously apply to the products you order or use. Please contact your local Canadian Solar sales representative to confirm the specific certificates available for your Product and applicable in the regions in which the products will be used.

CSI Solar Co., Ltd. is committed to providing high quality solar photovoltaic modules, solar energy and battery storage solutions to customers. The company was recognized as the No. 1 module supplier for quality and performance/price ratio in the IHS Module Customer Insight Survey. Over the past 20 years, it has successfully delivered over 63 GW of premium-quality solar modules across the world.

* For detailed information, please refer to the Installation Manual.

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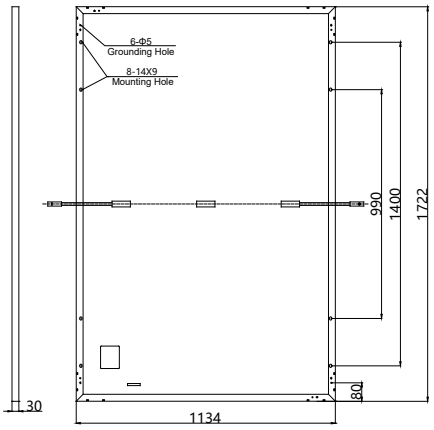
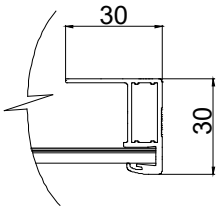
ENGINEERING DRAWING (mm)

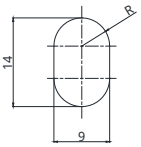
Rear View



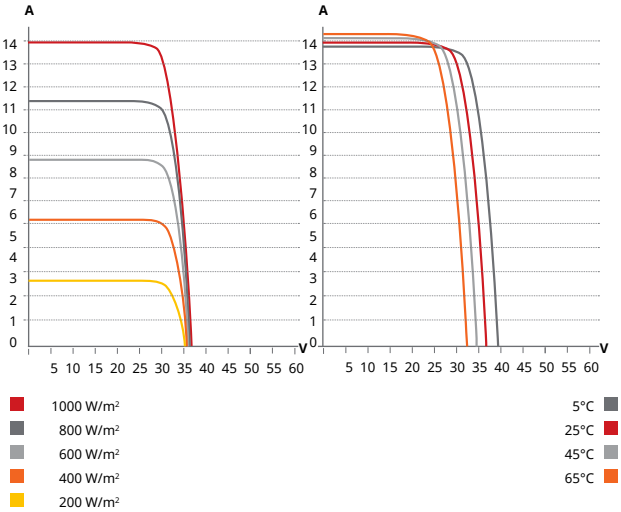
Frame Cross Section A-A



Mounting Hole



CS6R-405MS / I-V CURVES



ELECTRICAL DATA | STC*

CS6R	395MS	400MS	405MS	410MS	415MS	420MS
Nominal Max. Power (Pmax)	395 W	400 W	405 W	410 W	415 W	420 W
Opt. Operating Voltage (Vmp)	30.6 V	30.8 V	31.0 V	31.2 V	31.4 V	31.6 V
Opt. Operating Current (Imp)	12.91 A	12.99 A	13.07 A	13.15 A	13.23 A	13.31 A
Open Circuit Voltage (Voc)	36.6 V	36.8 V	37.0 V	37.2 V	37.4 V	37.6 V
Short Circuit Current (Isc)	13.77 A	13.85 A	13.93 A	14.01 A	14.09 A	14.17 A
Module Efficiency	20.2%	20.5%	20.7%	21.0%	21.3%	21.5%
Operating Temperature	-40°C ~ +85°C					
Max. System Voltage	1500V (IEC/UL) or 1000V (IEC/UL)					
Module Fire Performance	TYPE 1 (UL 61730 1500V) or TYPE 2 (UL 61730 1000V) or CLASS C (IEC 61730)					
Max. Series Fuse Rating	25 A					
Application Classification	Class A					
Power Tolerance	0 ~ + 10 W					

* Under Standard Test Conditions (STC) of irradiance of 1000 W/m², spectrum AM 1.5 and cell temperature of 25°C.

MECHANICAL DATA

Specification	Data
Cell Type	Mono-crystalline
Cell Arrangement	108 [2 X (9 X 6)]
Dimensions	1722 × 1134 × 30 mm (67.8 × 44.6 × 1.18 in)
Weight	21.3 kg (47.0 lbs)
Front Cover	3.2 mm tempered glass with anti-reflective coating
Frame	Anodized aluminium alloy,
J-Box	IP68, 3 bypass diodes
Cable	4 mm² (IEC), 12 AWG (UL)
Connector	MC4 or MC4-EVO2
Cable Length (Including Connector)	Portrait: 410 mm (16.1 in) (+) / 290 mm (11.4 in) (-); landscape: 1100 mm (43.3 in)*
Per Pallet	35 pieces
Per Container (40' HQ)	910 pieces

* For detailed information, please contact your local Canadian Solar sales and technical representatives.

ELECTRICAL DATA | NMOT*

CS6R	395MS	400MS	405MS	410MS	415MS	420MS
Nominal Max. Power (Pmax)	296 W	300 W	304 W	307 W	311 W	315 W
Opt. Operating Voltage (Vmp)	28.7 V	28.9 V	29.1 V	29.2 V	29.4 V	29.6 V
Opt. Operating Current (Imp)	10.33 A	10.39 A	10.45 A	10.52 A	10.58 A	10.65 A
Open Circuit Voltage (Voc)	34.6 V	34.8 V	35.0 V	35.1 V	35.3 V	35.5 V
Short Circuit Current (Isc)	11.09 A	11.15 A	11.21 A	11.28 A	11.34 A	11.41 A

* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m², spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

TEMPERATURE CHARACTERISTICS

Specification	Data
Temperature Coefficient (Pmax)	-0.34 % / °C
Temperature Coefficient (Voc)	-0.26 % / °C
Temperature Coefficient (Isc)	0.05 % / °C
Nominal Module Operating Temperature	41 ± 3°C

PARTNER SECTION

* The specifications and key features contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. CSI Solar Co., Ltd. reserves the right to make necessary adjustment to the information described herein at any time without further notice.
Please be kindly advised that PV modules should be handled and installed by qualified people who have professional skills and please carefully read the safety and installation instructions before using our PV modules.

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Appendix B:

PV Invertor Technical Information and test report

MOD 3000~9000TL3-X

- Max. efficiency 98.6%
- OLED and Touch button
- Type II SPD on DC and AC side
- String Monitoring
- AFCI optional

GROWATT

www.ginverter.com

POWER-INGO TOMO-RROWO

Datasheet	MOD 3000TL3-X	MOD 4000TL3-X	MOD 5000TL3-X	MOD 6000TL3-X	MOD 7000TL3-X	MOD 8000TL3-X	MOD 9000TL3-X
Input data (DC)							
Max. recommended PV power (for module STC)	4500W	6000W	7500W	9000W	10500W	12000W	13500W
Max. DC voltage	1100V						
Start voltage	160V						
Nominal voltage	580V						
MPPT voltage range	140V-1000V						
No. of MPP trackers	2						
No. of PV strings per MPP tracker	1						
Max. input current per MPP tracker	13A						
Max. short-circuit current per MPP tracker	16A						
Output data (AC)							
AC nominal power	3000W	4000W	5000W	6000W	7000W	8000W	9000W
Max. AC apparent power	3300VA	4400VA	5500VA	6600VA	7700VA	8800VA	9900VA
Nominal AC voltage（range*）	220V/380V, 230V/400V (340-440V)						
AC grid frequency（range*）	50/60 Hz (45-55Hz/55-65 Hz)						
Max. output current	5.0A	6.7A	8.3A	10.0A	11.7A	13.3A	15.0A
Adjustable power factor	0.8leading…0.8lagging						
THDi	<3%						
AC grid connection type	3W+N+PE						
Efficiency							
MAX. efficiency	98.3%	98.3%	98.3%	98.3%	98.6%	98.6%	98.6%
European efficiency	97.5%	97.5%	97.5%	97.5%	98.1%	98.1%	98.1%
MPPT efficiency	99.9%						
Protection devices							
DC reverse polarity protection	Yes						
DC Switch	Yes						
AC/DC surge protection	Type II / Type II						
Insulation resistance monitoring	Yes						
AC short-circuit protection	Yes						
Ground fault monitoring	Yes						
Grid monitoring	Yes						
Anti-islanding protection	Yes						
Residual-current monitoring unit	Yes						
String fault monitoring	Yes						
AFCI protection	Optional						
General data							
Dimensions (W / H / D)	425/387/147mm	425/387/147mm	425/387/147mm	425/387/147mm	425/387/178mm	425/387/178mm	425/387/178mm
Weight	12.5kg	12.5kg	12.5kg	12.5kg	14kg	14kg	14kg
Operating temperature range	- 25℃ ... +60℃						
Nighttime power consumption	< 1W						
Topology	Transformerless						
Cooling	Natural convection						
Protection degree	IP66						
Relative humidity	0~100%						
Altitude	4000m						
DC connection	H4/MC4(Optional)						
AC connection	Connector						
Display	OLED+LED/WIFI+APP						
Interfaces: USB/RS485/WiFi /GPRS/LAN/RF	yes/yes/Optional/Optional/Optional/Optional						
Warranty: 5 / 10 years	Yes/Optional						
CE, VDE0126, Greece, EN50549, C10/C11, UTE C 15-712, IEC62116, IEC61727, IEC 60068, IEC 61683, CEI0-21, N4105, TOR Erzeuger G98/G99, G100, AS4777, UNE217001, UNE206007, PO12.2							

* The AC voltage range and frequency range may vary depending on specific country grid standard.
All specifications are subject to change without notice.

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T: + 86 755 2747 1900 F: + 86 755 2749 1460 E: info@ginverter.com

GROWATT Test Report

Manufacturer: PV Inverter
Product number: PV02.0113902(GD)
Inverter specifications model: MOD 11KTL3-X
S/N: WLHFD4D00W
F/W Ver: DL1.0
Input: PV DC 500V
Output: Grid 3W/N/PE 230V/400V/50HZ
Ambient temperature: 25 °C

Test item	Test Value	Standard/Actual Value	Pass/Fail
Hi-pot			Pass
PV + /PV - Versus Ground			Pass
DC switch on, Use RS232 to connect inverter to computer, AC switch on.			
Inverter specifications model		MOD 11KTL3-X	
Set S/N		WLHFD4D00W	
Inverter State	Waiting	Waiting	
Communication Test			Pass
Inverter specifications model		MOD 11KTL3-X	Pass
Read S/N	WLHFD4D00W		Pass
Wait for 30s to start, delay 40s to ensure inverter connected to grid, read LCD data.			
Vpv(V)	498.8/498.2	500/(499.4/498.8)	Pass
Ipv(A)	11.5/11.4	11.0/(11.5/11.3)	Pass
Ppv(W)	5736.2/5679.4	5500/(5732.7/5622.1)	Pass
Vac(V)	218.9,221.7,219.4	230/(219.1,220.6,219.2)	Pass
Fac(Hz)	50.0	50/50.0	Pass
Iac(A)	17.4,17.5,17.3	16.0/(16.8,16.8,16.7)	Pass
Pac(W)	3802.6,3879.7,3796.2	3666/(3672.0,3705.3,3653.3)	Pass
Starting Time(s)	30	30	Pass
Conversion Efficiency		96.300%	Pass
Power Factor		0.993,1.0,0.992	Pass
THDI		1.3%,1.3%,1.38%	Pass
AC Switch off, delay 5s, AC Switch on.			Pass
AFCI			Pass
Appearance Check			☑ Pass/☐ Fail
Accessories Check			☑ Pass/☐ Fail
End.			

Result: Pass
Tester: QC003
Date: 2023-04-15 10:28:27

Appendix C:

Energy Saving Trust Calculation

energy saving trust

User

Energy Saving Trust

Your solar energy results

Solar panel system

Size of solar panel system : **7.1 kWp solar panel system** (typically 19 panels)

I want to change the size of my solar panel system

Savings and electricity generated

Total annual savings and payments : **£875**

Based on the following assumptions

Electricity generated :	**4,900 kWh** of low carbon electricity
Solar electricity used :	**30% of 4,900 kWh**
Savings on your electricity bill :	**£355**
Solar electricity exported :	**70% of 4,900 kWh**
Export payments :	**£520**

Due to rounding, the sum of these figures may be slightly different to the total annual savings and payments figure presented.

How is this calculated?

Environmental impact

Estimated carbon savings : **1,110 kg CO_2 per year**

That's equivalent to **42%** of an average UK home's carbon emissions.

Estimated installation cost

What does the installation cost include?

Full installation of a 7.1 kWp solar panel system : **£9,500**

These solar panels could pay for themselves after **11 years**.

ntenance costs